

WESTERN AUSTRALIAN

YEAR BOOK

1983

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WESTERN AUSTRALIAN YEAR BOOK

NULLARBOR CLIFFS

Near Eucla the southern end of the Nullarbor Plain ends abruptly in majestic cliffs which rise almost sheer sixty to 120 metres above the waters of the Southern Ocean.

The Creative Oasis, Sydney



WESTERN AUSTRALIAN YEAR BOOK

No. 21 — 1983

W. M. BARTLETT

DEPUTY COMMONWEALTH STATISTICIAN AND GOVERNMENT STATISTICIAN

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Western Australian Members of the House of Representatives

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PREFACE

This is the twenty-first issue of the present series of the *Western Australian Year Book*. The old series, originally published for the year 1886 and discontinued in 1905, developed from the Blue Books of the Colonial Office, London, which contained the earlier statistical records of Western Australia.

The Year Book provides a general description of Western Australia and includes authoritative information on almost every aspect of life in the State. Together with chapters on social and economic progress, the Year Book includes information on government, geography and climate, vegetation and fauna. Considerable use is made of statistical tables to supplement the descriptive text and, where appropriate, maps are also included for illustrative purposes. Each chapter contains the latest information available at the time of manuscript preparation.

Because of the time required for editing and printing the Year Book, later data on a particular topic will often be available in mimeographed publications or on request to the appropriate section of this Office. More detailed statistics on matters treated generally in the Year Book are available in other publications. The reader is referred to the complete list of publications of the Western Australian Office which is provided in the Appendix.

The reader's attention is drawn to the information service and library facilities provided by this Office, where all the publications of the Australian Bureau of Statistics are available for reference. Businessmen, manufacturers, primary producers, government authorities, students and the public generally are invited to make full use of these services.

I express my appreciation to the many external contributors for their part in the preparation of material for the Year Book. Special thanks are due to the Editor of Publications (Mr G. B. McLennan, B.Ec., B.Com.), other officers of the Bureau, and Advance Press Pty. Ltd., Vanguard Press and Printers Trade Services and their staffs for their role in the Year Book project.

W. M. BARTLETT
Deputy Commonwealth Statistician
and
Government Statistician

August 1983

GENERAL INFORMATION

Symbols

The following symbols mean:

n.a.	not available
n.e.c.	not elsewhere classified
n.e.i.	not elsewhere included
n.e.s.	not elsewhere specified
n.p.	not available for separate publication (but included in totals where applicable)
n.y.a.	not yet available
p	preliminary — figure or series subject to revision
r	figure or series revised since previous issue
..	not applicable
—	nil or rounded to zero
——	break in continuity of series (where drawn between two consecutive figures or columns)

Other forms of usage

Rounding. Where figures have been rounded, discrepancies may occur between sums of the component items and totals.

Citation of Acts. Acts of the Parliament of Western Australia are cited in italics throughout. The dates indicate the year of original enactment and the year of latest amendment.

Acts of the Parliament of the Commonwealth of Australia are cited in italics with the year of original enactment in roman type; all subsequent amendments are inferred.

Availability of ABS publications

Information regarding the availability of ABS publications can be obtained from the Information Services Section, Australian Bureau of Statistics, 1-3 St George's Terrace, Perth, W.A. 6000, or from other ABS Offices.

All publications produced by the Western Australian Office of the ABS are described in List of Publications (Catalogue No. 1101.5) which is available free of charge from this Office.

The Catalogue of Publications issued by Central Office provides a comprehensive list of all statistical publications issued by the ABS. This is available free of charge from any ABS Office.

In many subject areas there is a considerable amount of unpublished statistical information which is available on request. Inquiries should be made to the Information Service at this Office.

CHAPTER I — A HISTORY OF THE ABORIGINAL POPULATION

Contributed by

I. M. Crawford, M.A., Ph.D.

(Head of Division of Human Studies, Western Australian Museum)

Quantitative facts on the Aboriginal populations of Western Australia are hard to find. Estimates for the total number of Aborigines at the time of European settlement range from 40,000 to 100,000 and it is important to try to establish a more accurate figure. The population level at the time of European settlement is the benchmark for archaeologists projecting into the time prior to European settlement; it is a starting point for historians and anthropologists in their discussion of what happened after settlement, and how Aboriginal society functioned. It can be established that the Aboriginal population fell drastically after settlement, but how far it fell, what it is now and when it will return to its previous level are elusive questions.

Population Levels 1829-1982

The estimate most widely accepted for the Aboriginal population of Western Australia at the time of European settlement is that put forward by Radcliffe-Brown in the Commonwealth Year Book for 1930. He divided the State into districts and attempted to estimate the original population of each. By 1930 the original population levels had, of course, fallen drastically, and Radcliffe-Brown had little historical data to hand. He presented his figures as minimum estimates, suggesting the following:

Pilbara	24,000
South-west	12,500
Kimberley	9,700
Murchison/Eastern Goldfields	5,000
Total	51,200

He summarised his findings as indicating a minimum population of 52,000 and a probable population of 55,000. D. S. Davidson gives a slightly higher figure of 55,000 to 63,000. Other estimates of the numbers of tribes in Western Australia with an assured average of 500 people per tribe gives a total of 63,000, or with an assured average of 600 people per tribe the higher total of 75,600. There has, therefore, been some consensus that the population prior to European settlement was in the 50,000 to 60,000 bracket. Recently, L. R. Smith (1980), after a comprehensive analysis of the various estimates, accepted 62,000 as the most likely figure.

Turning to Radcliffe-Brown's figure in detail, it is immediately obvious that he did not attempt to estimate the population of the deserts of Western Australia at all, except in so far as the Eastern Goldfields are included in it. His total population is therefore short by a figure for this very large area. Perhaps because the European life style has not easily adapted to the arid regions, white Australians have projected their own notions into the reconstruction of the Aboriginal society and thus seriously underestimated the desert as a life-supporting region. M. J. Meggitt, working over data on the Arunda, arrived at a population level which, if transferred to the arid area of Western Australia, would result in a desert population of 48,000 people. That seems an overestimate. R. M. and C. H. Berndt gave an estimate of 10,000

people for the southern part of Western Australia's desert and 18,000 for the whole desert including part of South Australia (1964). If we subtract a notional 3,000 from their total as representing the South Australian element, then 15,000 for the Western Australian desert areas does not seem unreasonable.

Turning to other areas, Radcliffe-Brown's figures for the Pilbara are interesting for this was the area he knew best and where he had carried out field work. He calculated the number of 'hordes' and estimated that each would have had at least 30 people. This gave him a total population of 24,000, an average of 20 people per 100 square kilometres. Radcliffe-Brown noted that the region 'is by no means a favourable one'; an implication of his statement is that he underestimated the population in the more favourable areas of Western Australia, particularly the Murchison and Kimberley. If we were to apply his figures to these areas, the population of the State would have exceeded 100,000. In fact his Pilbara estimate seems too high, although a figure in the order of 18,000 does not seem unreasonable.

Radcliffe-Brown seriously underestimated the population of the Murchison and Eastern Goldfields area. His figure of 5,000 is not compatible with Grey's accounts of enormous yam fields, regular tracks and well-built mudlined huts arranged in villages. It may well have been the most favourable region of Western Australia in Aboriginal terms, and the population is likely to have been around 20,000. Radcliffe-Brown's Kimberley estimate also seems too low. This figure was calculated by E. P. Elkin who had some first hand experience of the local situation. However, by the time Elkin carried out his field work in the late 1920s, the Aboriginal population had seriously declined. Intense guerilla warfare between Aborigines and settlers along the Fitzroy in the 1890s, attacks by pearlers on the northern coast and by gold seekers in east Kimberley from the 1880s on, measles and the 1919 influenza epidemic had all taken heavy toll. From my own knowledge of the country and its resources, I would suggest that the population had been in the order of 15,000 prior to European settlement. The Fitzroy area in particular must once have been densely populated.

Discussing the data for the south-west area, Radcliffe-Brown cited the figure produced by Stirling of one Aboriginal to two square miles, but rejected this as an overestimate. He adopted a figure of one person per four square miles or 25 people per hundred square miles. Taking a large area of approximately 50,000 square miles as comprising the south-west, this gave him a total figure of 12,500 for the region. Recent research has pushed even that estimate down. Sylvia Hallam, after working through the historical data, calculated that for the coastal plain, in an area roughly one hundred kilometres north to one hundred kilometres south of Perth, there was probably a population of about 420, and a likely average of 25 people per hundred square miles (Hallam 1977). This is the same as Radcliffe-Brown's estimate for density of the whole of the south-west. However, the coastal plain was a particularly rich area and the population density decreased in the forest and across the ranges into the dry areas. R. M. Berndt has estimated the population at 6,000 persons (an overall average of 12 people per hundred square miles) (Berndt 1973). Revised estimates for the Aboriginal population are as follows:

Pilbara	18,000
South-west	6,000
Kimberley	15,000
Murchison/Eastern Goldfields	20,000
Arid zone	15,000
Total	74,000

The discussions outlined above show that the figures are by no means certain. Several avenues of research may improve them. Analysis of the data in mission and government records could result in the reconstitution of Aboriginal families and although that data reflects the

situation at the time of recording, often some years after settlement when factors which led to the decrease in Aboriginal population had already been operating, it should be possible to use these figures to make reliable back projections. This should enable us to estimate population densities for those areas where the figures are reasonably reliable and project in areas where figures are not available or are completely unreliable. A word of caution is needed here, because it is often difficult to reconstruct the precise Aboriginal pattern which applied to any one area. Studies in the north of the Kimberley for example indicate that, while the same resources are available in adjacent areas or in a similar ecological zone, minor differences in soil or access to different ecological systems result in major differences in Aboriginal patterns of subsistence. What appear to be minor environmental differences lead to quite major differences in Aboriginal economies and associated population levels. Further studies of the Aboriginal kinship systems, some of which have a territorial basis, may also help reveal the population levels of the past.

It is inevitable that the figures for Aboriginal population at the time of white colonisation must be no more than estimates, but at what points do the figures become reliable? The truth is they remain somewhat elusive up to the present time, as shown by a comparison of the graphs at the end of this Chapter. There were various estimates during the 19th century, and Aborigines within settled areas were counted during most of the 19th century. But the first serious attempt to count the countable and estimate the rest was made in 1901. From that time to the present, Population Census figures and State Government estimates have differed, with State totals somewhat higher than those revealed in the Census. One reason for this is that the annual State Government figures always included an estimate of the part-Aboriginal population which grew rapidly after the turn of the century whereas the figures derived from the Censuses attempted to exclude part-Aborigines until the 1966 Census.

The estimate for Aborigines beyond the settled areas is one factor which also makes Census and State figures incompatible prior to 1971. This figure was 23,888 in the 1901 Census figures and although estimates fluctuated, it was still as high as 18,960 in 1933. State estimates of population beyond the settled areas were on the whole rather lower than those of the Census. As Smith has remarked, when the area outside the counted region decreased with the expansion of settlement, the actual size of the population was found to be less than expected.

Prior to the 1967 referendum, when Section 127 of the Constitution (relating to exclusion of 'the People of the Aboriginal Race . . . in reckoning the Population') was repealed, the Population Census required a person to state his or her racial ancestry; a person of multiple racial origin was asked to identify as 'halfcaste'. Variants of this question had been asked on earlier Census forms, but questions such as these caused some objection. From 1971 Census forms have asked people for their own identification. The earlier questions were, in effect, designed to produce information on the genetic structure of the population and the later question on the sociological structure. Thus the figures before and after the 1967 referendum are not strictly comparable. People of multi-racial ancestry have the option of identifying with either of their cultural traditions, and it is suggested that not all people of Aboriginal descent will choose to identify as Aboriginal. Indeed some may choose in one context to identify as Aboriginal and in another to identify differently. Until the 1970s there were serious disadvantages in being an Aboriginal. Restrictive legislation, and social problems such as the refusal of schools to accept Aboriginal children, typified the situation prior to 1940. Although restrictive legislation was largely repealed in the 1940s and finally disappeared in the early 1960s, assimilation remained the government policy through the 1960s, and people who had a right to choose their identity were still under government and social pressures to opt for identification with the majority group. Subsequently, governments have been anxious to make up for some of the past disadvantages, and with the development of special legal assistance, health programmes, housing schemes and scholarships, and with the possibility of regaining control of the land there are now material benefits in identifying as Aboriginal.

Whether to identify as Aboriginal or not cannot be viewed simply in terms of disadvantages versus benefits. There have been enormous changes in community attitudes. There is now much greater acceptance of the cultural traditions of all minority groups, amongst whom are the Aborigines. Aboriginal self-identification has flourished, drawing inspiration from America, Canada, New Zealand and Africa. Better documentation of the Aboriginal past has resulted in greater public awareness and value of Aboriginal culture. For instance, documentation of Aboriginal land management techniques has done much to replace the image of Aborigines aimlessly wandering in this continent. Archaeology is providing a better knowledge of the history of the first settlement of Australia, and is documenting its great antiquity. Aboriginal culture, once ignored in Australia, is now included in school curricula and displayed in a multitude of books and television programmes.

Out of this fluid situation can we find some stable population reference points? Smith accepts the figure of 28,000 in 1971, a figure which is the State Departmental estimate and confirmed by State Health Authorities' independent figures. If this is correct, the Commonwealth's Census figure of 1971 was about 6,000 too low. The latest Census figures, the result of the 1981 Census count, give a total Aboriginal population for Western Australia of 31,351. In the Aboriginal Affairs Planning Authority *Annual Report*, the Aboriginal population at the end of June 1982 was estimated at 40,365 which is about 8,000 higher than the Census figure plus natural increase for the year. While the Census figure must be taken as a reliable figure of the population which identifies itself as Aboriginal, the Aboriginal Affairs figure is probably a reliable estimate of the population in which there is a significant Aboriginal element in the ancestry.

Prehistoric Populations

The population level at the time of European settlement provides a reference point for archaeologists when they try to reconstruct prehistoric populations. From her analyses of old camp sites Ms Hallam concluded that the population level in the coastal plain had reached its peak only shortly before European settlement, whereas further inland the population level had apparently remained constant during the last few thousand years.

As we project further back in time, there are more and more variables. By the time Europeans settled, Aborigines had developed specialised technologies to capitalise on local and regional environments. As hunting and harvesting efficiency improved, population levels may have gone up. The distinctive implements from the Kimberley, the Western Desert and the south-west reflect regional specialisation. Extensive exchange systems ensured the supply of raw materials to areas where these were deficient. Aborigines, by burning the bush, had learnt to manage the land to optimise conditions for grazing animals such as kangaroos. From the Kimberley down the coast to Geraldton, they ensured the continuation of root crops by replanting the growing nodes of yams and thus practised a form of incipient agriculture. We do not yet know when these specialised technologies developed, but archaeological evidence for seed grinding and for the treatment of poisonous cycads is accumulating, and indicates a long history for these techniques.

The date of arrival of the ancestors of the Aborigines remains a matter of speculation. There is no doubt that they came from South-East Asia, and the journey would have been easier at a time of low sea level. As these levels were below that of the present back to 120,000 years ago, the crossings may have taken place at any time within that period, but the attention of archaeologists has been focused on the periods of very low sea level 30,000 to 39,000 years ago and 50,000 to 58,000 years ago. A much greater antiquity of occupation is hinted at by recent finds, with particular interest in the era 100,000 to 150,000, and speculation of occupation at an even earlier era.

The earliest fully-established dates for Aboriginal occupation of Australia are associated with stone artefacts in a terrace of the Swan River near Midland. The radioactive carbon 14 method dates this site to about 38,000 years ago. That date is little greater than those for Lake Mungo in N.S.W., and together they imply the colonisation of Australia at the beginning of the then-existing low sea level period, or during the preceding low sea level commencing roughly 50,000 years ago. Other early evidence is more equivocal. Mammoth Cave, in the south-west, has produced a repetitive pattern of bone breakages, an incised bone, and charcoal possibly from cooking fires in deposit older than 37,000 years. The faunal remains include many extinct species (so-called 'giant fauna'). Stone artefacts from the terraces of the Murchison may also be associated with extinct fauna, and may prove to be of considerable antiquity. Other early archaeological dates come from Devil's Lair (occupied 33,000 to 8,000 years ago), 26,000 years ago at a rock shelter at Newman in the Pilbara and 18,000 years ago at Miriwun Rock Shelter in the Ord Valley, Kimberley.

Traditional Society : Population Control

It is a matter of debate whether Aboriginal population levels were controlled by environmental factors such as food resources and water supplies, or whether they were controlled by social factors. One imagines that the population level was related to food supplies at the lowest season, in a bad year. Thus in the Kimberley, torrential rain in the monsoonal wet season could prevent people from hunting and then, although there were food resources, they could not be harvested. Aborigines hoarded some food supplies against such an occasion, but prolonged rain did lead to low dietary levels. During droughts in the arid regions, people might have been prevented from reaching fertile territory by intervening waterless tracts.

There is also evidence that socially-induced factors controlled population levels. Throughout Western Australia, Aborigines held the belief that unexpected deaths not resulting from old age or natural calamity were induced by malicious actions of enemies. These they sought to revenge. Particularly in the north, there were long drawn-out vendettas which led to spearings by raiding parties, or even to formal pitched battles. In following these practices, Aborigines saw themselves as continuing a pattern of behaviour introduced by the Creative Beings in the Dreaming.

Fertility levels were probably low by modern standards. The space between children seems to have been in the order of four years. Aboriginal women suckled their children until they were about three years old: recent research suggests that active lactation suppresses ovulation, thus keeping the fertility rate low. Both abortion and infanticide were practised when parents decided that they could not care for children.

One interesting factor which has emerged from analyses of the population figures is that male children survived in higher numbers than female children. Smith cites a ratio of 115 males per hundred females based on, apparently, the 1911 Census (Smith 1980). The 1891 figures show a ratio of nearly 129 males per hundred females, and Hallam's analyses of the figures for the Perth region produce a ratio of 150 males per hundred females and 144 per hundred at New Norcia (Hallam 1977). Hallam notes that whatever factors were producing this imbalance, they were operating prior to settlement. Smith suggests the practice of female infanticide. Whatever the cause, it would have reduced the fertility rate within the population.

When Aboriginal populations were under stress, either because of warfare or shortage of food or water, old people who were no longer mobile were either abandoned or killed. During normal times, Aborigines cared for the aged, and traditions tell how people carried the old and led the blind from camp to camp for many years. In emergencies when the presence of such people threatened the viability of the social unit, they were no longer supported.

Population Trends 1829-1982

However unreliable the statistics may be for the size of the Aboriginal population at the time of European settlement, it undoubtedly declined drastically through the nineteenth and first half of the twentieth century. In the years immediately after the Second World War, the Aboriginal population was only a fraction of its former level: that fraction was as high as a quarter, perhaps as low as an eighth. Until that decline was halted, and the population started to increase, as it did in the decade 1945-55, there was little prospect that Aborigines would survive. Observers of the nineteenth and first half of the twentieth centuries correctly spoke of the Aborigines as 'a dying race'.

Some of the reasons why the Aboriginal population declined are well understood. In the 'frontier' situation where Aboriginal and European cultures met there were physical conflicts when the lands which the Aborigines used were occupied. In the Kimberley, where Aborigines had come into contact with Indonesians prior to European settlement, the trauma of the impact seems less than in the south. Kimberley Aborigines defended their lands using techniques devised during the earlier conflicts with the Indonesians. The results were mixed. Aborigines on the west Kimberley coast regarded the European withdrawal from Camden Harbour in 1865 as a notable victory. An Aboriginal leader known to the Europeans as 'Pigeon' successfully conducted guerilla warfare in the Oscar-Napier Ranges from 1890-93. In the eastern Kimberley, the impact of gold rushes in the Halls Creek area and of pastoral settlement resulted in a high incidence of shootings. The slaughter of a considerable number of Aborigines at Oombulgurri near Forrest River in 1926 has been documented. Many shootings were never made public, although they are remembered by Aborigines. Individual clans and tribes were destroyed in these encounters, but the actual number of Aborigines (and Europeans) killed has not been estimated.

Introduced diseases were another cause of the decline in the Aboriginal population. Aborigines who came to live in the settlements or on the stations faced, for the first time, epidemic diseases to which the European communities had built up resistance. Measles and chickenpox are known to have caused many deaths, and these spread beyond the settlements to Aborigines living in the bush. Respiratory infections also killed many Aborigines, and the 1919 influenza epidemic is still remembered by Aborigines as a major disaster. This epidemic was also widespread. There are accounts of Aborigines dying from the flu, or dying from starvation because, afflicted by influenza, they were too weak to forage for food. This epidemic is said to have decimated the Murchison Aboriginal population. In the 1930s leprosy spread among the Kimberley Aborigines.

With the loss of land, both the economic and spiritual bases for traditional life were disrupted. Many Aborigines were unable to make the psychological adjustments to the new conditions. Europeans regarded Aborigines as second-rate citizens. Legislative restrictions bound Aborigines to work on stations or in the pearling industry, and the Aborigines lost their freedom of movement. The novels and newspapers of the time reflect the contemptuous attitudes held by the community at large. Dampier's description of Aborigines, written in 1688, featured in school text books well into the twentieth century:

'The Inhabitants of this Country are the miserablest People in the World. The Hodmadods . . . , though a nasty People, yet for Wealth are Gentlemen to these; . . . setting aside their Humane Shape, they differ but little from Brutes.'

Faced with hostility, the loss of their lands and freedom, their culture overwhelmed, some Aborigines saw no future for themselves. 'Worried people don't have children', said the late Albert Barunga: 'We were a worried people'. It is difficult to reconstruct the psychological condition of the Aborigines in this period, although one can understand the level of depression. This, and low libido undoubtedly affected fertility levels as in other communities

which, under threat, have also recorded very low fertility. Added to the psychological condition were poor nutrition and ill-health on stations and in settlements which must have contributed to the low fertility rates.

After Aboriginal society had been overwhelmed during European colonisation, both abortion and infanticide increased. Aborigines who could see no future for themselves, saw even less for their offspring and sometimes deliberately killed them rather than rear them to face a hopeless world. The anthropologist Norman Tindale recorded this situation among the Unggarinyin in the Kimberley in the 1930s. Missionaries throughout the State reported that infants and children died in suspicious circumstances.

During the decade 1945-55, the decline was halted. The statistics show that the population started to increase in the south around 1949 and in the north a few years later. One obvious factor was the introduction of better medicines to counter diseases. Antibiotics were made available to Aboriginal communities in the late 1940s and early 1950s, reaching communities closer to established medical centres first. Improved transport, for example, with the Royal Flying Doctor Service resulted in extended medical care to remote areas soon afterwards. Better hygiene, the result of health education, and better housing have contributed to a healthier population. Probably the most important reasons for the growth in population have been the changed community attitudes towards Aborigines and Aborigines' attitudes towards themselves. There are still many problems for Aborigines, and the heavy drinking problem suggests that some have not entirely thrown off their depression, but the fertility rates are high, and the children now have a better chance of survival than in the past. If the present rate of increase is maintained, the number Aborigines in the State will rise to equal the number prior to European settlement in the decade after the year 2000.

Distribution of Aborigines

On the establishment of European settlements there was some movement of Aborigines into these areas. Inevitably the new settlers selected those areas with good soils and permanent water supplies for their stations. In so doing, they disrupted the traditional Aboriginal migratory movements and removed the key places from Aboriginal control. Then, as pastoralism developed, there was a broader conflict over land management. Aborigines used to burn off the old grasses and undergrowth: pastoralists saw wandering Aborigines as a threat to their stock, and the fires as a threat to their property. Sometimes they drove the Aborigines away; certainly pastoralists expected to defend their stock and homesteads during the early years of settlement. A few settlers became paranoid and went out to massacre Aborigines, sometimes with police assistance. The 'Battle of Pinjarra' was the first massacre recorded in Western Australia, but in Aboriginal accounts there were many others. Faced with this situation, many Aborigines chose to settle at the stations. They accepted protection from the station management in return for their labour. Men worked stock, and women assisted at the homesteads. This pattern of a large station complex, with its resident Aboriginal population, developed first in the south. In her memoirs of station life at Gnowangerup in the late nineteenth century, Mrs Edith Hassell described a model of Aboriginal-white relations which was to be repeated in the Murchison, Pilbara and the Kimberley. In the south, it did not last for long. Mrs Hassell remarked that the station, which had been a small village, reduced as machinery replaced human labour around the turn of the century.

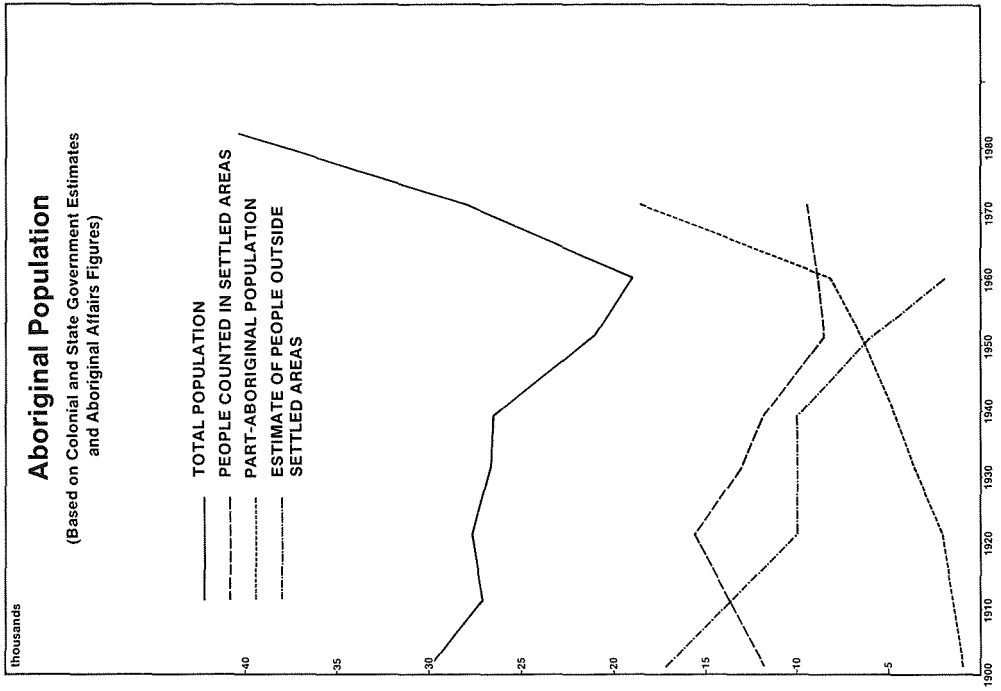
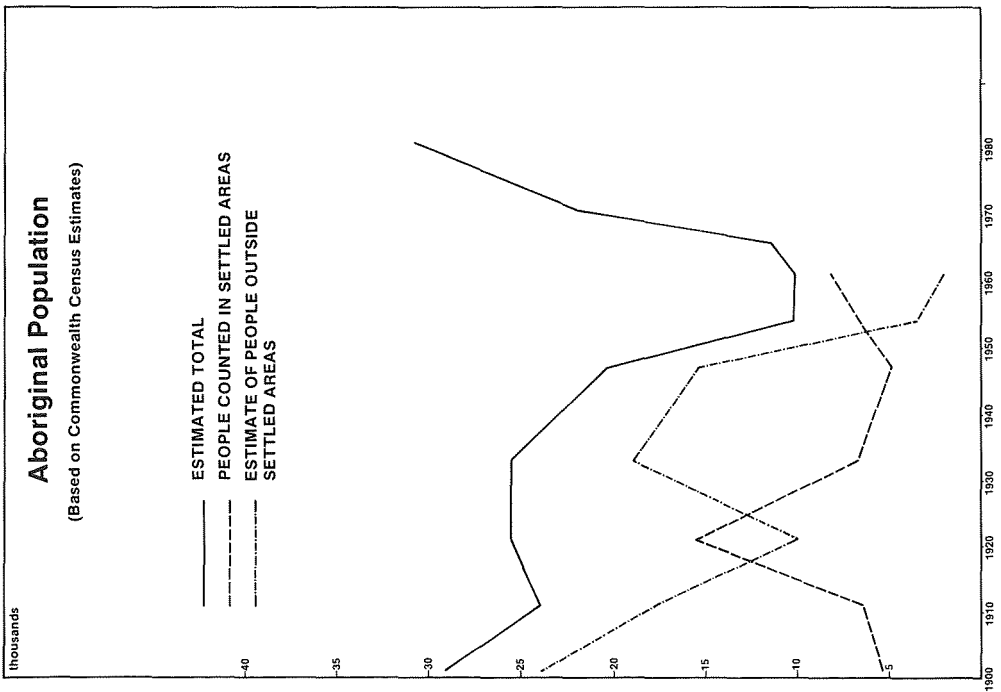
Further north, Aborigines left the stations at a later date. In the Pilbara, the exodus was a dramatic event; the Aboriginal strike of 1947 saw about 800 Aborigines leave the pastoral life. Few resumed it. As four-wheel-drive vehicles, mainly ex-army, replaced the stock horse, the stations reduced their dependence on labour. In the Kimberley, after the Pastoral Award was extended to include Aborigines, large groups of Aborigines moved to the towns. The introduction of helicopter mustering and cattle-trains on upgraded roads made the stations less dependent on Aboriginal stockmen. In the post-war period, Aborigines have increasingly become an urban population.

In the 1970s, there has been a counter movement leading Aborigines back to the land, but in very different circumstances from the old days of dependence on pastoralists. With government and community support Aborigines have been able to regain control of some areas which were either traditional home-lands or where they had been raised. They now manage their own stations. Aborigines, in many cases, see the 'out-station' movement as a solution to some of the social problems which arise in the towns. The most obvious of these problems is alcoholism, but that in itself is probably a reflection of deeper conflicts. In 1982, there were over 20 million hectares under Aboriginal management.

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NOTE. Readers interested in the European Discovery and Early Settlement of the State are referred to Chapter I of the *Western Australian Year Book*, No. 20 — 1982 and earlier issues. An Historical Survey of Western Australia is to be included in the 1985 Year Book.



CHAPTER II — PHYSICAL FEATURES, CLIMATE, FLORA AND FAUNA

Area and Coastline of Australia

The area of the States and Territories and the length of the coastline of Australia were determined in 1973 by the Division of National Mapping of the Department of National Resources by manually digitising these features from the 1:250,000 map series of Australia. Consequently, only features of measurable size at this scale were considered. About 60,000 points were digitised at an approximate spacing of 0.5 kilometres and these points were joined by chords as the basis for calculation of areas and coastline lengths by computer.

The approximate high water mark coastline was digitised and included all bays, ports and estuaries which are open to the sea. In these cases, the shoreline was assumed to be where the seaward boundary of the title of ownership would be. Rivers were considered along similar lines but the decisions were rather more subjective, the digitised line being across the river where it appeared to take its true form. In mangroves, the shoreline was assumed to be on the landward side.

Areas and lengths of coastline determined by the foregoing methods are given in the following table. The Division of National Mapping is also progressively revising areas of local government authorities but has not yet completed this work. For this reason, areas given for statistical divisions do not add to the total area shown for the State.

State or Territory	Present area	Percentage of total area	Length of coastline (a)
	sq km		kilometres
New South Wales	801,600	10.43	1,900
Victoria	227,600	2.96	1,800
Queensland	1,727,200	22.48	7,400
South Australia	984,000	12.81	3,700
Western Australia	2,525,500	32.87	12,500
Tasmania	67,800	0.88	3,200
Northern Territory	1,346,200	17.52	6,200
Australian Capital Territory	2,400	0.03	(b)
AUSTRALIA	7,682,300	100.00	36,800

(a) These measurements are broadly on a 'direct' basis but, even so, they must be regarded as approximate only. (b) Australian Capital Territory, Jervis Bay area included in New South Wales.

Part 1 — Physical Features and Geology

Contributed by

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The development of any country depends on its natural resources and the industry of its people, and there can be few more important investigations for any country than those dealing with the productive capacity of its territory. Natural resources — be they power, mineral, or soil resources — are dependent entirely on the climate, physical features and geology. Looking at

the pattern of development of Western Australia we see that for nearly seventy years after the foundation of the Swan River Colony in 1829 agricultural production barely kept pace with the requirements of the small population. The gold discoveries in the 1890s, however, led to a period of rapid expansion and Western Australia became one of the major gold-producing areas of the world, and with this increase in mining production there was a corresponding expansion of the agricultural and pastoral industries. We are now experiencing an expansion of our secondary industries. Today, with the realisation of the base metal mineral potential of Western Australia — the proven deposits of iron ore, nickel, bauxite, black sands, oil and natural gas and the high probability of further discoveries — we are in another period of unprecedented development. Mineral discoveries of the past decade in Western Australia stimulated the mining industry not only in Western Australia but throughout the whole of Australia. The Western Australian mineral discoveries of the late 1960s were accompanied by a corresponding increase in our secondary industries and the opening up of formerly sparsely populated areas, particularly in the Pilbara. Western Australia has, to date, been deficient in power resources, but this deficiency will be remedied by the development of large natural gas reserves discovered near the southern margin of the North-West Shelf. In each of these phases of development we can see the dominating influence of the geological environment so that geology, from being relatively unknown and the Cinderella of the sciences, has now become known to all.

The nature of the rocks underlying any region is one of the major factors controlling topography, soil, and mineral resources. The latter is self-evident. The soil, on which we are so dependent, was formed by the weathering of the underlying rocks and many of its characters are due to the parent rock material. Much research has been carried out into trace element deficiencies in soils and the application of the new knowledge has produced astounding results as far as land utilisation is concerned. At first it would seem fantastic to think of the underlying rocks being in any way responsible for malnutrition of stock, but when it is demonstrated that the malnutrition is due to the lack of some minor element in the fodder which is due to its deficiency in the soil, a deficiency which, in its turn, is due to the absence or relative absence of such elements from the parent rocks from which the soil was derived, the significance of the geological environment becomes evident. Topography which is important in connection with land utilisation, water conservation, power (hydro-electric) resources, and in affecting climate, soil erosion, coastal erosion, transport routes, harbours, and so on is also dependent to a great extent on the nature and structure of the underlying rocks.

It is appropriate therefore that we should consider here the physical features and geology of Western Australia since they, together with the climate, are the primary controls of our soil, mineral, water and power resources, on which our existence and future development are entirely dependent.

PHYSICAL FEATURES

In the broadest way this State can be divided into two physical regions: (i) a tableland (the *Great Plateau*) in various stages of dissection occupying the whole of the interior of the State; (ii) a low-lying narrow strip (the *Coastal Plains*) running almost continuously along the coast from near Albany to Broome. A third physical region, the *Scarplands*, separating the Coastal Plains from the Great Plateau, may be distinguished. This, although only a narrow belt, is a significant one in the southern part of the State because of its importance in connection with the water conservation schemes on which the metropolitan area, the mining fields in the vicinity of Kalgoorlie, the intervening agricultural and pastoral districts, the irrigation areas on the coastal plains south of Perth, and more recently the wheat belt along the Great Southern Railway, are dependent.

The Great Plateau

The Great Plateau which occupies more than 90 per cent of the area of the State varies considerably in elevation. In its highest parts (in the north-west) it attains a height of

approximately 1,200 metres above sea-level. The greater part is, however, below the 600-metre contour and its average elevation is of the order of 300 to 450 metres above sea-level. Although there is this considerable variation in level the changes are so gradual that the plateau character of the country is not obscured and for the most part it may be regarded as having a vast, gently undulating surface. Occasional hills (monadnocks, which are remnants of a previous cycle of erosion) rise above the general surface of the plateau.

The Great Plateau may be conveniently subdivided into an area of exterior drainage (where there are definite rivers which flow to the sea), an area of interior drainage (where such water as flows passes into inland basins), and two areas of no surface drainage but which, if they had drainage, would belong to the exterior drainage system. The area of exterior drainage can be marked out by connecting the source of the streams which flow to the sea and if this is done it will be seen that the width of the exterior drainage belt varies considerably. Thus in the Kimberley and North-West Divisions some of the rivers are hundreds of kilometres long, but in the south-west part of the State many of them are comparatively short. The areas of no surface drainage are in the north of the North-West Division along the Eighty Mile Beach from the mouth of the De Grey River to the north of Broome, and on the Nullarbor Plain in the south-eastern corner of the State. The remainder of the country forms the interior drainage area.

In the area of exterior drainage the dominant feature of the extreme south-west and the northern part of the plateau is a reticulate pattern of rather deeply-incised watercourses. In the southern part of the State these deeply-incised watercourses where they pass from the plateau to the coastal plains are of great significance (as has already been mentioned) in connection with water supply schemes. Elsewhere in the State the marginal portion of the Plateau is drained by rivers that flow to the sea only at times of exceptional rainfall and, speaking in the most general way, have courses at right angles to the coast.

The area of interior drainage is arid and practically riverless. Small creeks run from the higher parts of the country but they either disappear on the extensive flats or reach the shallow basins which are termed salt or 'dry' lakes, the term 'dry' being used since these so-called lakes are free from water except after fairly heavy or long-continued rain. These 'lakes' are generally elongated, narrow, and often winding salt-encrusted flats arranged in long, more or less connected streams. After heavy rain they are covered with a thin layer of water and, after unusually heavy rain, water has been known to flow southwards from one to another of the 'lakes' of a string, except towards the western margin of the plateau where the drainage is to the west. It is evident that these elongated 'lakes' are the remnants of an old river system developed during a more humid period. The salt lakes are of some economic significance since, on the evaporation of the water, common salt and other substances such as gypsum are deposited on the floor of the lake. The gypsum, which crystallises earlier than the common salt, is generally blown from the damp surface of the dried-up lake and deposited as dunes of 'seed gypsum' on the leeward (eastern) side of the lake. These dunes are utilised, for example at Lake Seabrook north of Yellowdine, as a source of gypsum for plasters. Common salt, which separates later, forms a crust on the floor of the lake when it has been completely dried up and such salt deposits are exploited, for example at Lake Lefroy near Widgiemooltha. In a few of the Western Australian salt lakes, such as Lake Champion, significant deposits of alunitic clay (a potential source of potash) have been discovered. More important potash deposits occur in some coastal lakes, such as Lake MacLeod, north of Carnarvon.

Over a large portion of the interior drainage part of the Great Plateau there are extensive sand-plain soils overlying a hard laterite ('ironstone') layer, which is of the order of up to four and a half metres in thickness, below which lies an intensely weathered zone from which most of the nutrient elements so important for plant growth have been leached. These more recent geological formations will be discussed in the section of this Part dealing with geology, but we may note here the significance of this lateritic profile (sandy soils near the surface, 'ironstone' about a metre below, and completely kaolinised rocks still deeper) so far as soil fertility is

concerned. This lateritic profile is the result of long-continued weathering processes which have resulted in almost complete leaching of the valuable nutrients and as a result soils developed in any part of this profile are generally very poor in character. It is only where erosion has cut through the lateritic profile and still younger soils have been formed by weathering of the underlying rocks that the better soils are found. Recent studies of trace element deficiencies indicate, however, that much can be done with these 'light' soils by the addition of small quantities of suitable trace elements such as copper and molybdenum.

The areas of no surface drainage include the Eucla Division and portions of the Eastern Division of the State. This area is occupied largely by flat-bedded, nearly horizontal limestones of the Nullarbor Plain and the drainage here is sub-surface in character by subterranean streams through caverns in the limestone. The Nullarbor Plain is an extensive monotonously level plain standing about 180 metres above sea-level. The Western Australian part of the Nullarbor Plain is bordered to the south by a narrow coastal plain but further east, at the head of the Great Australian Bight, in South Australia, this coastal plain is absent and the southern edge of the Plain is truncated by cliffs which rise almost sheer for sixty to 120 metres above sea-level.

The hills of the Great Plateau are of two kinds, ridged and table-topped. In the southern half of the State the ridged hills, a few of which rise as much as 450 metres above their surroundings, are generally elongated in a NNW direction, reflecting in their trend the structure of the underlying rocks. The table-topped hills are seldom more than sixty metres above the general level. They are capped with a sub-horizontal layer of laterite ('ironstone') and bounded by low cliffs, in many places undercut, which are known in Western Australia as 'breakaways'. The table-topped hills are relics of erosion of a former laterite-covered peneplain (the *Darling Peneplain*) which was uplifted in Pliocene times to form the Darling Plateau and has subsequently been subjected to erosion under semi-arid conditions. The ridged hills on the other hand are elongated monadnocks which, being cored by resistant rocks such as jasper bars, withstood erosion and so rise above the general level of the remnants of the laterite-covered Darling Plateau.

The Great Plateau slopes down very gradually to the south and west. The downward slope to the south is interrupted by a narrow broken chain of rugged hills, the Stirling and Mount Barren Ranges which rise to heights of from 300 to 1,100 metres above sea-level. The western margin of the Plateau is, in the south, formed by the 'Darling Range' which, being merely the dissected margin of the Plateau, is much better called the *Darling Scarp*. This Darling Scarp is clearly defined between latitudes 31° 30' S and 33° 30' S, i.e. between Moora and Donnybrook, but it is difficult to recognise farther north or south. In the Kimberley Division the mountain ranges are the relics of erosion between the deeply-incised rivers and in this region the highlands of the Plateau terminate abruptly along a steep, deeply-indented coastline.

The Coastal Plains

Bordering the Great Plateau are the Coastal Plains which vary in width. The *Swan Coastal Plain* which extends from the neighbourhood of Perth to near Busselton averages about twenty-four kilometres in width and is divisible into the following belts: a narrow band of moving sand dunes along the coast; a zone, averaging five or six kilometres wide, of sandy limestone which rises in places to heights of thirty to sixty metres above sea-level; a zone five or six kilometres wide of loose sand fixed by vegetation; and, abutting against the Scarp which forms the western margin of the Plateau, a zone of clayey soils of about the same width. A strip of low plain extends along the coast at intervals as far north as King Sound and coastal plains of some width occur near Port Hedland and Exmouth Gulf. A narrow plain fronts the cliffs of the Great Australian Bight for some distance and also occurs in other places along the south coast.

The coastline of Western Australia, some 12,500 kilometres in length, is broken by capes between Wyndham and Broome, between Port Hedland and Shark Bay, and between Cape Naturaliste and Israelite Bay. The intervening parts are comparatively featureless.

It has only been possible here to briefly outline the principal physical features of Western Australia and for a fuller description of the physiography of this State the reader should consult J. T. Jutson's 'Physiography (Geomorphology) of Western Australia' (*Geol. Surv. West. Aust. Bull.* 95).

GEOLOGY

About two-thirds of Western Australia is occupied by the ancient Australian Precambrian Shield which is composed of a complex of igneous, metamorphic and sedimentary rocks formed more than 600 million years ago. Most of our mineral deposits of economic importance, except coal, oil, natural gas and water and superficial deposits such as lateritic iron ore and bauxite deposits and black sand and other alluvial accumulations, occur in these Precambrian rocks. The remainder of the State is occupied by sedimentary basins in which Palaeozoic and later sediments are developed. It is in these younger sedimentary basins that artesian water, coal, oil and natural gas are likely to occur. Finally there are still younger superficial deposits—laterites, salt-lake deposits, shallow groundwater, and soils on which much of the economy of this country depends. It will be convenient therefore, in outlining the geology of the State, to consider it under the three main headings:

- (a) The Precambrian basement;
- (b) The sedimentary basins;
- (c) The superficial deposits;

The distribution of the solid rocks (omitting superficial deposits) is shown in the following map.

The Precambrian Basement

This includes the Archaean and Proterozoic rocks. The Archaean is a complex of crystalline igneous and metamorphic rocks, dominantly granites and gneisses with minor amounts of schistose metamorphosed acid and basic volcanics and sedimentary formations. In places, particularly in the North-West and Kimberley Divisions, this Archaean complex is overlain unconformably by sedimentary and volcanic rocks of Proterozoic age which generally do not exhibit the extensive metamorphism so characteristic of the older Archaean complex. The time-boundary between the younger Precambrian (Proterozoic) and older Precambrian (Archaean) is approximately 2,200 million years ago. Within the different areas occupied by the Precambrian rocks the same generalised sequence can be distinguished.

In the Kimberley the oldest rocks are metamorphosed igneous and sedimentary rocks intruded by granite and carrying in places auriferous and base metal ore deposits, and these are overlain by un-metamorphosed sediments with basic igneous intrusives. The Precambrian age of all these rocks is evidenced by the fact that in the east Kimberley they are overlain by sedimentary rocks containing fossils of Cambrian age. This is the only area in Western Australia where the Precambrian age of the rocks of this crystalline complex can definitely be proved on stratigraphical evidence alone. In the southern part of the State we find a similar sequence of crystalline schists with intrusive granites and by lithological correlation (which is not a very sound method) we assume that they are Precambrian although they cannot actually be traced through from the Kimberley. We do know that in the Carnarvon Basin these gneisses, schists and granites are older than the Devonian, which unconformably overlies them, and in the Perth Basin they are older than the Permian. During recent years the Precambrian age of these rocks has been confirmed by actual age determinations based on the decay of radioactive elements which occur in them. This work indicates that the bulk of the massive granitic intrusions of the southern part of the State and in the Pilbara crystallised from a molten state some 2,700 million years ago. Some, however, such as those in the vicinity of Albany and along the south coast, are much younger, being emplaced approximately 1,100 million years ago.

The Precambrian sequence in the North-West appears to be the most complete that is present in Western Australia. This region consists of the Pilbara Block to the north and the

Median Belt to the south, separating the Pilbara Block from the Yilgarn Block. The Pilbara Block consists mainly of Archaean igneous and metamorphic rocks with small areas of unconformably overlying Proterozoic sedimentary rocks. The Median Belt on the other hand is made up mainly of Proterozoic sedimentary rocks, with a few comparatively small inliers ('islands') of Archaean rocks. This Median Belt consists, structurally, of two large Lower Proterozoic sedimentary basins: the Hamersley Basin overlapping the Pilbara Block to the north and the Nabberu Basin overlapping the Yilgarn Block to the south. The central part of this Median Belt is occupied by Middle to Upper Proterozoic sediments, which overlie the Lower Proterozoic sedimentary rocks of the Hamersley Basin to the north and the Nabberu Basin to the south.

The Precambrian sequence in the Pilbara Block and Median Belt, from oldest to youngest, is as follows.

The *Warrawoona Group*, which consists mainly of greenstones and green schists which, prior to intense folding and metamorphism after their deposition, were submarine basaltic lavas and tuffs, with thin interbedded chemically deposited sedimentary rocks (chert, jaspilite and banded iron formations). Conformably overlying the basaltic volcanics is a sedimentary succession (the *Gorge Creek Group*) of banded iron formation and clastic sediments (sandstone, shale and conglomerate). The banded iron formation of this group is the parent material of important iron ore deposits such as those of Mount Goldsworthy. Clastic sedimentary rocks unconformably overlying the Warrawoona volcanics in the eastern Pilbara form the *Mosquito Creek Beds*. These are thought to probably correlate with the Gorge Creek Group further west. The sedimentary assemblage of the Gorge Creek Group is unconformably overlain by acid volcanics (part of the *Whim Creek Group*) which, at Whim Creek, are the host rocks of the copper-lead-zinc deposits. All of these rocks have been intruded by granitic igneous rocks, the older gneissic granitic rocks being formed about 3,100 million years ago, and the younger massive granites approximately 2,700 million years ago. The older volcanic and sedimentary successions carry auriferous ore-bodies, possibly genetically related to the younger intrusive granites. End-stage products of these younger granites are the very coarse-grained pegmatites which are important carriers of tantalum (in tantalite), beryllium (in beryl), lithium (in spodumene and lepidolite), and tin (in cassiterite). All of these rocks in the North-West — the Warrawoona and Mosquito Creek Successions and the granites intrusive into them — are therefore of Archaean age and have been called the *Pilbara System*. These Archaean rocks have been intruded by north-south trending basic dykes emplaced approximately 2,300 million years ago. These dykes do not penetrate the overlying Lower Proterozoic sediments, but may be feeders of some of the basic volcanics of the lower part of the Lower Proterozoic sequence. Still younger sedimentary rocks such as conglomerates, sandstones, shales and banded iron formations with interbedded basic igneous rocks, were deposited unconformably on the highly-folded, granite-intruded Pilbara System. This thick succession consists of a number of distinct groups. The three lower groups (the *Fortescue*, *Hamersley* and *Wyloo Groups*) are of Lower Proterozoic age as the youngest (the Wyloo Group) is intruded by granite aged approximately 1,700 million years. The two upper groups (the *Breshnahan* and *Bangemall Groups*) are of Middle and Upper Proterozoic age, respectively. Of these Proterozoic rocks the Hamersley Group is most important economically since most of the iron-ore deposits of the Hamersley and Ophthalmia Ranges such as those of Mount Tom Price, Mount Newman and Paraburdoō occur within, or have been derived from, the thick jaspilites (banded iron formations) within this group. Except in occasional narrow belts marginal to the Archaean blocks, the Proterozoic rocks have not suffered the intense folding that affected the older rocks and consequently they are generally flat-dipping to horizontally bedded un-metamorphosed sediments. Such sediments cover very extensive areas in the North-West (see Geological Map of Western Australia on previous page) and they are similar in many respects to the flat-dipping Proterozoic sediments which cover the plateau country of the north Kimberley.

Coming to the southern half of the State we find a similar sequence to that in the North-West. In the part of the Precambrian Shield extending south of latitude 26° S (the Yilgarn Block) the oldest rocks that are recognised are the greenstones of the various gold-mining fields which occur in comparatively narrow belts elongated in a general NNW direction (see following map). These greenstones, which are for the most part metamorphosed basaltic lavas, contain interbedded ultrabasic lavas and jaspilites and are overlain by metamorphosed sedimentary rocks which contain accessory zircon (with radiogenic ages approximating 3,300 million years) derived from pre-existing rocks. About 3,000 million years ago, the greenstones and metasedimentary rocks were intensely compressed into tightly closed folds with NNW-trending axes. During this period of intense earth-movement, granitic magma concordantly intruded these older rocks or alkaline solutions permeated them, converting them into granitic gneisses which occupy most of the southern half of Western Australia. This System of rocks has been called the *Kalgoorlie-Yilgarn System*. From the mining point of view, the greenstone and metasedimentary parts of this System are most important since the auriferous ore deposits of the main mining fields are confined to it, as are the known nickel deposits. It also contains, in the jaspilites, important iron-ore deposits such as those of Koolyanobbing in the Yilgarn. Subsequently, at about 2,700 million years ago, granite magma was again intruded as in the North-West, so the Kalgoorlie-Yilgarn System in the southern half (the Yilgarn Block) of the State appears to be the equivalent of the Pilbara System of the Pilbara Block. This completes the Archaean sequence. The Proterozoic is represented by a narrow strip of slightly altered, steeply-dipping sedimentary rocks along the Darling Scarp and flat-dipping sediments on top of the older crystalline rocks of the western part of the Yilgarn Block as at Watheroo, Yandanooka and the Billeranga Hills near Morawa. Proterozoic igneous activity is represented by Early Proterozoic layered complexes and Late Proterozoic basic dykes. The former (probably comparable to the north-south suite of the Pilbara Block), aged 2,420 million years, take the form of basic-ultrabasic layered complexes, such as the large east-west dykes of the Norseman-Laverton greenstone belt which have some prospects for the occurrence of nickel and chrome deposits. The latter are dolerite dykes which intruded all of the Precambrian rocks about 550 million years ago. They occur throughout the Precambrian Shield but are most abundant near its western margin where some are quarried and crushed for road metal.

The strip of country south of, and including, the Stirling Range, and extending in an east-north-easterly direction to the Fraser Range (east of Norseman) and thence in a north-easterly direction into Central Australia, differs from the previously described Yilgarn Block. In it the regional trend is east-west compared with the north-north-westerly trend of the Yilgarn Block. It consists of a belt of crystalline schists and gneisses (exposed along the south coast) intruded by granite (as at Albany and Esperance). These crystalline rocks are very similar to the granitic gneisses of the Yilgarn Block, but the massive granites were intruded much later — approximately 1,100 million years ago, compared with the 2,700 million years age of the late-Archaean granite intrusives of the Yilgarn Block. These crystalline rocks are overlain unconformably by still younger low-grade metasedimentary phyllites and quartzites (originally mudstones and sandstones) comprising the *Stirling Range Beds*. Both the granite-intruded basement and the *Stirling Range Beds* are intruded by dolerite dykes, similar to those of the Yilgarn Block. Although the granites of this South Coast Province are much younger than those of the Yilgarn Block, it is thought that the *Stirling Range Beds* and the intrusive dolerite dykes are comparable with the Proterozoic sediments and dolerites of the Yilgarn Block.

There is a comparatively narrow strip of crystalline metamorphic rocks along the western margin of the Perth Basin and wrapping around the northern margin of the Yilgarn Block. The southern part extending from Cape Leeuwin to Cape Naturaliste is a belt about twenty kilometres wide of isoclinally folded gneisses, with a regional NW trend, which have a radiogenic age of 650 million years, while the part extending northerly from Geraldton through the Northampton Mineral Field consists of NW-striking metasedimentary granulites and gneisses

containing segregation pegmatites aged about 1,000 million years and intruded by basic dykes comparable to the Late Proterozoic dykes of the main part of the Shield. Recent work by the Geological Survey of Western Australia indicates that metamorphic rocks along the northern margin of the Yilgarn Block are most probably metamorphosed Bangemall (*i.e.* Upper Proterozoic) sediments. It is evident, therefore, that the main Yilgarn Archaean Block is almost completely ringed with metamorphosed Proterozoic rocks.

Putting together the information available throughout the State, we conclude that the oldest rocks found in Western Australia belong to the older part of the Archaeozoic Era. It is a great succession of rocks, generally much metamorphosed, which is called the Kalgoorlie-Yilgarn System in the southern part of the State and the Pilbara System in the north-west region. In the early part of Kalgoorlie-Yilgarn (Pilbaran) times there was much volcanic activity which took the form of eruptions of ultrabasic, basic and intermediate lavas, tuffs, and breccias. Many of the basic lavas, as judged from the pillow structures they contain, were submarine extrusions. These volcanic rocks were penetrated, shortly after their extrusion, by intrusions from the same magma. Similar events must be occurring now in the interior of great volcanic masses like Etna or Hawaii. In later Kalgoorlie-Yilgarn times, the dominant process was sedimentation, so that the earlier volcanic rocks, with the minor associated bands of sediment, became overlain by a great thickness of sandy and clayey sediments. These sediments must have been derived from some land mass composed of rocks of pre-Kalgoorlie-Yilgarn (pre-Pilbaran) age but this, possibly the oldest of all rock assemblages, has apparently not yet been found in Australia or any other part of the World.

After the accumulation of these older Archaean lavas and sediments came a period of intense earth-movement during which the rocks were, in most places, tightly folded and regionally metamorphosed. The folding (about 3,000 million years ago) was accompanied by widespread granitic intrusions, some of which consolidated into primary gneisses whereas others soaked into the pre-existing rocks, penetrating them along bedding planes, joints, and other fractures, and so forming hybrid granitic gneisses by granitisation.

Where they were not affected by this First Granite Invasion, the volcanic rocks of the Kalgoorlie-Yilgarn and Pilbara Systems were regionally metamorphosed, in some places very strongly into dark-coloured schists, in others only very slightly. Similarly, the sedimentary rocks of the Kalgoorlie-Yilgarn and Pilbara Systems, where they have escaped granitisation, are in some places only slightly regionally metamorphosed slates and phyllites, in others they are highly metamorphosed and converted into various types of schist and quartzite.

All the Archaean rocks described above were invaded by the 'Younger' Granite, which, unlike the 'Older' Granite, formed well-defined intrusions many of which are stocks, though smaller offshoots from the same magma, in the form of 'porphyry dykes', occur at nearly every mining centre. These events occurred after the folding but before Proterozoic times. Any of the Archaean rocks in Western Australia may contain ore-bodies yielding gold and other minerals of economic value containing metals of economic value such as tin, tantalum and tungsten. It seems likely that many of these ore-deposits were formed at the time of the Second Granite Invasion which, from radioactive age determination studies, occurred about 2,700 million years ago. Important iron-ore deposits also occur in the Archaean rocks at many localities, for example at Mount Goldsworthy in the Pilbara, Talling Peak in the Yalgoo Goldfield, and Koolyanobbing, Bungalbin and many other localities in the North Yilgarn. These are all sedimentary banded ironstone deposits which are interbedded with the basaltic lavas and sedimentary rocks of early Archaean age. In many places there are important manganese deposits associated with these banded iron formations. A rich nickel deposit discovered in ultrabasic Archaean rocks at Kambalda near Kalgoorlie in 1966, has now become an important source of nickel. Base metal ore deposits, such as nickel, cobalt and chromium, are generally associated with ultrabasic igneous rocks. Ultrabasic rocks are intrusive into or interbedded with the older Archaean volcanic and metasedimentary rocks of the Kalgoorlie-Yilgarn System

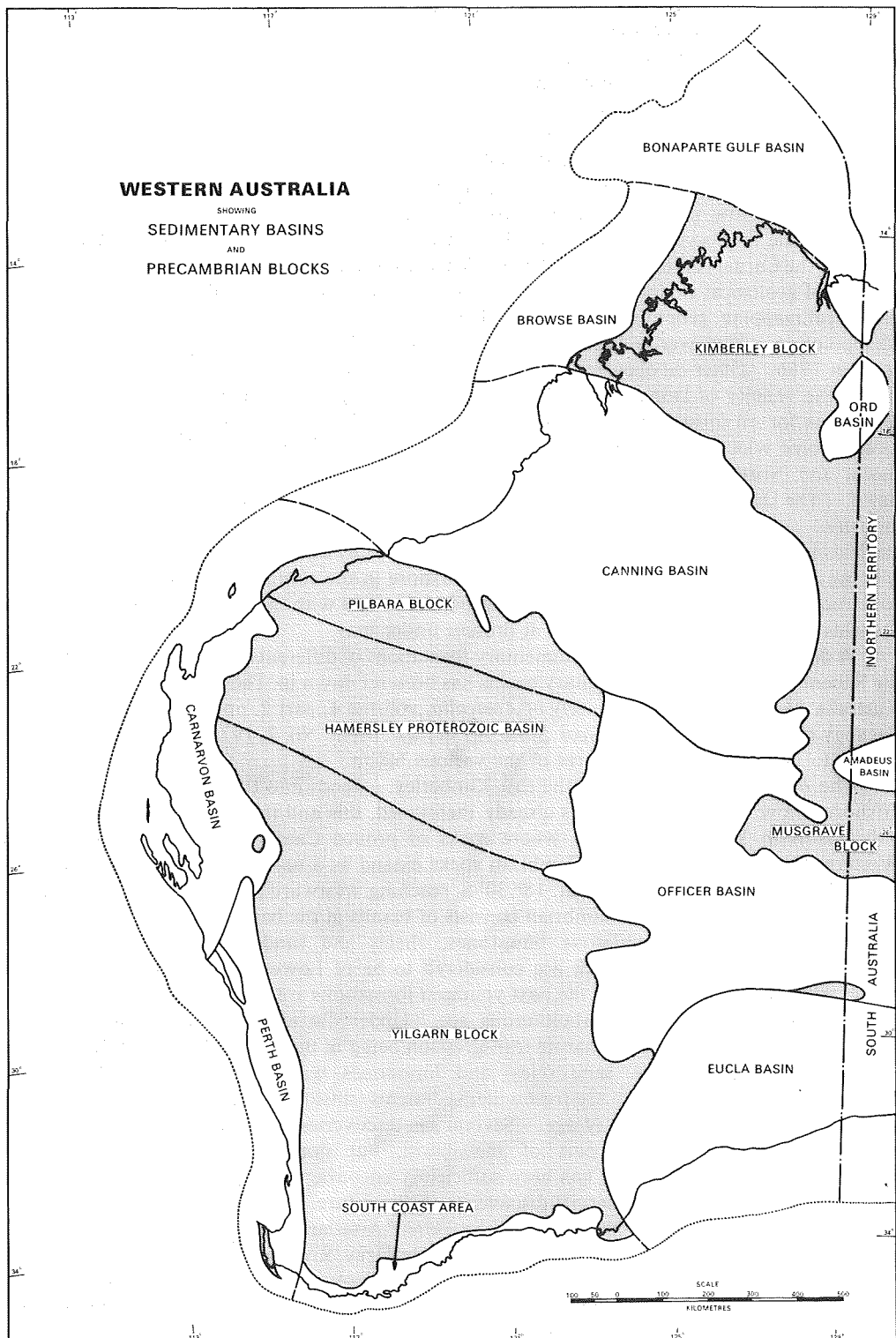
in the country between Norseman and Laverton, and important nickel deposits have been discovered, evaluated, and are now being exploited at localities such as Kambalda and Scotia near Kalgoorlie, Mount Windarra near Laverton and Mount Keith near Agnew. Between 2,300 and 2,400 million years ago basic dykes (N-S in the Pilbara Block and E-W in the Yilgarn Block) were intruded.

Finally, in Proterozoic times we had the deposition, under shallow-water conditions, of conglomerates, sandstones, shales and banded iron formations, another period of volcanic activity yielding basaltic lava flows and three periods of granite intrusion (at 1,700 million years ago in the Pilbara, 1,100 million years ago along the south coast and 600 million years ago in the Paterson Range, east of the Pilbara Block). Other than in a few narrow belts and a peripheral belt around the Yilgarn Block, these rocks have not suffered the intense earth movements which affected the older rocks, and so are practically un-metamorphosed. Important blue asbestos deposits in these rocks have been exploited at Wittenoom Gorge in the Hamersley Range of the West Pilbara. The asbestos deposits occur in banded ironstone formations which also contain large iron-ore deposits. The well-known iron-ore deposits of Cockatoo and Koolan Islands in Yampi Sound, which have been exploited since 1951, are metasedimentary deposits of Late Proterozoic age. Although the Proterozoic rocks cover extensive areas in the northern parts of the State they have largely been stripped off the southern half by erosion. The final episode in the Precambrian history of this State was the widespread intrusion of dolerite dykes approximately 550 million years ago. Small lead and copper deposits are closely associated with these dolerite intrusions in the Northampton Mining Field, where the discovery of a lead deposit at Geraldine in 1848 led, in 1852, to the first commercial metal mining operations in Western Australia.

The Sedimentary Basins

There are five major post-Proterozoic sedimentary basins in Western Australia and the adjoining continental shelf as shown in the following map — the *Bonaparte Gulf Basin* in the north-east part of the Kimberley Division extending into the Northern Territory, the *Canning Basin* of the west Kimberley, the *Carnarvon Basin* of the North-West, the *Perth Basin* extending from lat. 29° S to lat. 33° S and the *Eucla Basin* occupied by the Nullarbor Plain. All of these basins have offshore extensions as shown in the following map. Large areas of the Central Division are covered by sediments of the *Amadeus Basin* of Central Australia and the shallow *Officer Basin*. In the east Kimberley, the *Ord Basin*, with a sequence beginning with basaltic volcanics of Cambrian age, extends into the Northern Territory. In addition to these major basins there are smaller basins such as that at Collie and scattered areas where sediments, which are dominantly lacustrine in nature, have been deposited. In these sedimentary areas we find sediments ranging from Lower Palaeozoic to Pleistocene in age. These sediments of Palaeozoic and later age are, as a rule, less disturbed than those of Precambrian times and many are abundantly fossiliferous. Therefore, there is a sure means of correlating formations even in widely separated places, and so our knowledge of the history of these sedimentary areas is more detailed than that of the much altered, highly folded, un-fossiliferous Precambrian rocks of the basement.

Apart from the superficial deposits the economic significance of these basins is confined to their possibilities for the occurrence of artesian water, coal, oil and natural gas. A prime requisite for the occurrence of artesian and sub-artesian water is the occurrence of interbedded strata of varying porosity and permeability. These conditions are met in a number of the sedimentary basins in Western Australia and the development of the pastoral industry in the arid or semi-arid parts of these basins has been largely dependent on the occurrence of artesian water. In the metropolitan area, artesian bores are an important source of water supplies, although these deep, pressure-water bores have become, of recent years, of secondary importance to the shallow groundwater of the Wanneroo and Jandakot Mounds. Coal deposits are also confined to areas of sedimentary rocks and occur in the Permian rocks of several of the



POST-PROTEROZOIC SEDIMENTARY BASINS AND PRECAMBRIAN BLOCKS OF WESTERN AUSTRALIA
(PRECAMBRIAN AREAS STIPPLED)

minor basins, namely the *Collie*, *Wilga* and *Irwin River Basins*, and in the Lower Jurassic sediments of the Perth Basin (at Eneabba, where a seam thirty metres thick has been found at a depth of 1,800 metres in a borehole sunk in search of oil, and is indicated in shallow shot-holes in the Hill River area). Low grade Tertiary brown coal deposits occur in the shallow sediments of the *Bremer Basin* along the south coast. Up to 1966 the coal deposits of the lacustrine Permian beds of the Collie Basin constituted the only power source in Western Australia, since oil of commercial significance had only then been proved and the gently undulating topography combined with low rainfall make the hydro-electric resources insignificant. So far as oil is concerned the first occurrence of flow oil in Australia was encountered in Rough Range Bore No. 1, in the Carnarvon Basin, late in 1953. This discovery of flow oil resulted in an increase in the rate of geological exploration of all the major sedimentary basins. The results of extensive geological mapping, geophysical surveys and exploratory drilling for oil have to date been rather disappointing. However, a commercial field was proved at Barrow Island off the north-west coast in 1966. Other oil occurrences have been located at various localities in the Perth Basin, e.g. in the vicinity of Dongara and this indicates the presence of suitable source material and conditions for oil formation and preservation. Moreover, oil search drilling operations have located some widely-spaced important finds of natural gas at Dongara and Gingin in the Perth Basin, and North Rankin and Goodwyn in the offshore part of the northern Carnarvon Basin. The Dongara gasfield is now being exploited for the metropolitan area of Perth and the industrial areas further south. The possibilities of locating other commercial oilfields and gasfields in the Carnarvon, Canning and Perth Basins are by no means exhausted and the search is being actively continued both on land and offshore in the continental shelf area. Intensive construction works, both marine and land based, concerned with the exploitation of the offshore gasfields of the North West Shelf are at present under way.

A detailed description of the sedimentary formations of different ages, from the Cambrian to the Recent, in the various sedimentary basins has been set down in 'The Stratigraphy of Western Australia' (*Journal Geological Society of Australia*, volume 4, part 2, pp. 1-161, 1958) and 'The Geology of Western Australia' (*Geol. Surv. West. Aust. Mem. No. 2*, 1975). It is proposed here merely to indicate the main features of the various basins.

The *Bonaparte Gulf Basin*, in the east Kimberley, extends into the Northern Territory and offshore below the Timor Sea. As already mentioned, this and the nearby *Ord Basin* are the only basins in Western Australia where rocks of proved Cambrian age are exposed. On Western Australian territory the Cambrian rocks extend as a narrow belt along the interstate border between lat. 16° 15' S and lat. 18° 30' S, reaching westward from the border for twenty-four to 120 kilometres. The Cambrian consists of basalts at the base of the sequence, overlain by Middle Cambrian fossiliferous limestones, shales and sandstones. There is a small development of sandstones which are considered to be of Lower Ordovician age, following which there is a big time gap and the next youngest formations are sandstones and limestones of Upper Devonian and Lower Carboniferous age. Upper Carboniferous and Lower Permian formations are absent, the next marine transgression being in the Middle Permian when a thick sequence of conglomerates, sandstones, and limestones was deposited. The only other sedimentary rocks in this basin are freshwater sediments (siltstones, marls and cherts containing freshwater fossils) of late Tertiary age. Several gas discoveries and a single oil discovery have been made in the offshore part of this basin, but none is commercially viable at present. However, exploration has been sufficiently encouraging to suggest that the basin has reasonable prospects for commercial discoveries in the future.

The *Canning Basin* (formerly named the Desert Artesian Basin), in the west Kimberley, extends from the coast between Derby and the De Grey River in a south-easterly direction almost to the 128° meridian. The north-east or Fitzroy part of this basin consists of a comparatively narrow and shallow section (the Lennard Shelf) flanking the Precambrian land mass to the north, and a deep trough (the Fitzroy Trough) estimated, from aeromagnetic

geophysical surveys, to contain a thickness of the order of 6,000 metres of sedimentary strata ranging in age from Ordovician to Triassic. It was in this area that bores seeking oil were first drilled in Western Australia, following the discovery in 1919 of traces of oil in a water bore on Gogo Station. The larger Canning Desert portion, the South Canning Basin, is covered by a relatively thin Mesozoic and Permian sequence, but geophysical work followed by some deep drilling has indicated that there are deep depressions in this area, the deepest of which is the Kidson Sub-basin, which has a basement approximately 6,000 metres below the surface.

The oldest Palaeozoic sediments in the Fitzroy portion of the basin are richly fossiliferous limestones of Ordovician age outcropping near Price's Creek. These are overlain by Devonian reef limestones, sandstones and conglomerates, followed by Carboniferous sandy limestones. These in turn are followed by a thick Permian sequence of sandstones (of marine glacial origin deposited from floating ice), fossiliferous calcareous shales and limestones, and Upper Permian fossiliferous ferruginous siltstones and sandstones. All of these formations dip gently in a general south-westerly direction towards the centre of the basin but these regional dips are interrupted by local folding. Shale and sandstone beds of Triassic age occur in the Fitzroy Trough section of the basin. The youngest rocks in this area are igneous extrusive lava flows and intrusive sheets, dykes, and volcanic necks which have been found intruding all rocks of the sequence from the Precambrian granitic basement to the youngest sediments (Triassic) present. These igneous rocks, from direct geological evidence, are of post-Triassic age, and radioactive age determinations made in 1959 indicate that they were intruded 180 million years ago (*i.e.* in Jurassic times) although more recent dating studies indicate they were emplaced in Early Miocene times (approximately 20 million years ago). This is one of the two areas in the whole of Western Australia where post-Cambrian igneous activity is known. It is interesting to note the occurrence of a small lead deposit in Devonian limestone at Narlarla in the Napier Range. This is the *only* primary metallic ore deposit of post-Proterozoic age known in Western Australia and it may be genetically related to the Jurassic igneous activity or may have been deposited from sea water by organisms during Devonian times. In 1978, diamonds were found in 'kimberlitic' plugs probably related to these Jurassic igneous rocks, and evaluation of these deposits is now taking place to determine their commercial viability.

In the Canning Desert section of the basin the Palaeozoic rocks are not well exposed and the greater part of this portion of the basin (where not obscured by superficial unconsolidated sands) is occupied by Mesozoic sediments ranging in age from Lower Jurassic to Lower Cretaceous. The deep depressions in the floor of the South Canning Basin are filled with Palaeozoic sediments as proved by the first deep oil test well (Kidson No. 1) which was abandoned at 4,431 metres in Lower Ordovician limestone. There is no evidence in the entire basin of any marine transgression after Lower Cretaceous times.

The basin extends some 320 kilometres offshore to the coral islands of the Rowley shoals where some wells have been sunk in the search for oil. Drilling in search of oil and gas both onshore and offshore has to date proved disappointing and, with the exception of Blina No. 1, no commercial discoveries have yet been made.

The *Browse Basin*, a wholly offshore basin, is situated offshore from the North Kimberley Precambrian Block. It contains a thick sequence (at least 12,000 metres) of Carboniferous to Tertiary sediments. The first well drilled in this basin was in 1971, when Scott Reef No. 1 (drilled in an atoll rising from the continental slope about 400 kilometres north-west of Derby) made a major gas/condensate discovery at depths between 4,296 and 4,389 metres. Other wells, drilled to date, on the continental shelf part of the basin have been dry.

The *Carnarvon Basin* (formerly called the North-West Artesian Basin) has been the most intensively studied of the major sedimentary basins in Western Australia. It extends along the west coast from near Dampier as far south as the mouth of the Murchison River, the maximum width of the basin being 200 kilometres at the latitude of Carnarvon. In this basin the eastern portion up to eighty kilometres wide is occupied by a thick sequence of marine Palaeozoic

sedimentary rocks ranging in age from Middle Devonian to upper Middle Permian, all of which have a westerly regional dip. This Palaeozoic sequence which consists of fossiliferous Devonian limestones and sandstones, Carboniferous limestones and Permian marine glacial beds, limestones, sandstones, and shales, is almost entirely marine in origin. In the Carnarvon Basin we have the only wholly marine Permian sequence in Australia, and without doubt one of the thickest marine Permian sequences in the world.

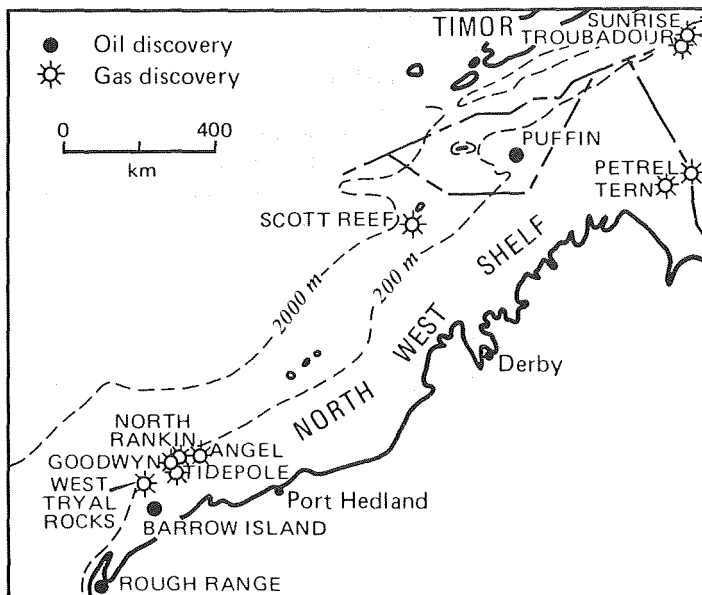
No rocks of Silurian age were known from the western half of the Australian continent until 1957 when a bore sunk by West Australian Petroleum Pty. Ltd. at Dirk Hartog Island in Shark Bay encountered limestones of Silurian age underlain by sandstones which are now correlated with the reddish sandstones which outcrop in the lower reaches of the Murchison River.

To the west the Permian rocks are unconformably overlain by Cretaceous sandstones, shales, marls and limestones attaining a total thickness of 600 metres. It is the basal formation, the *Birdrong Sandstone*, of the Cretaceous sequence that is the oil sand encountered in Rough Range Bore No. 1. Another Cretaceous formation, the *Windalia Formation*, is one of the important oil reservoirs of the Barrow Island Oilfield. The Cretaceous rocks outcrop in a north-south belt averaging eighty kilometres wide between the Palaeozoic and Precambrian rocks on the east and the Tertiary limestones to the west. The only other Mesozoic formation exposed at the surface in this basin is a Jurassic sandstone eight metres thick. However, a deep well (Cape Range No. 2) drilled in search of oil at Exmouth Gulf, after passing through the base of the Cretaceous at 1,130 metres, entered the Lower Jurassic which extended to the depth of 4,624 metres at which the bore was discontinued, thus proving a thickness of at least 3,494 metres of Lower Jurassic strata in this area. It is apparent that there is a marked thickening of the Mesozoic formations from east to west in this area. The westernmost belt of the Carnarvon Basin is occupied by Tertiary strata, mainly limestones, which are well exposed in the Rough and Cape Ranges of the Exmouth Gulf area. These limestones, which range from Lower Miocene to Pliocene in age, total 365 metres in thickness and are discontinuously overlain by Pleistocene and Recent beds approximately 135 metres thick. Marine Tertiary sediments which are so well developed along the western margin of the basin extend as a thin discontinuous formation unconformably over the Permian beds of the eastern part of the basin, indicating that in Upper Eocene times the sea transgressed practically the whole of the Carnarvon Basin.

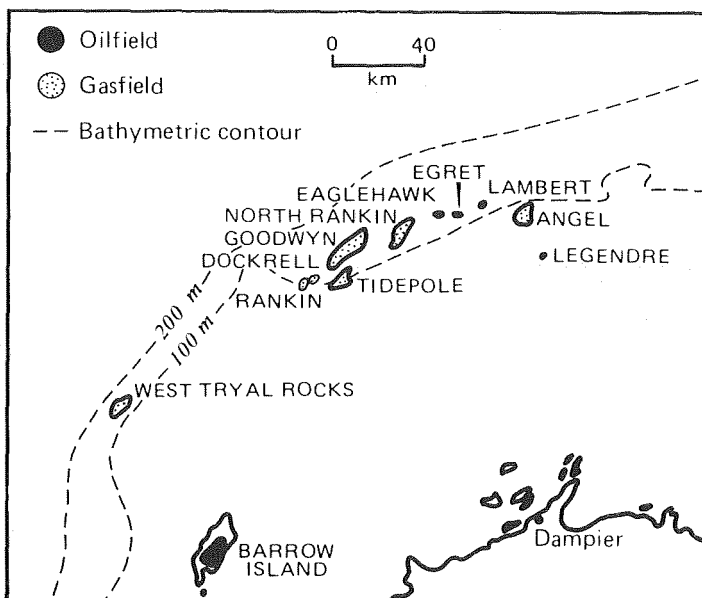
The sedimentary rocks of the Carnarvon Basin were affected by earth movements at various times. Even the youngest of the Tertiary rocks have been thrown into gentle folds which are significant so far as the search for oil is concerned because, in addition to having suitable conditions for the formation and preservation of oil, suitable structures are necessary for its concentration into local areas (oil 'pools'). So far as structure is concerned, the general picture of the Carnarvon Basin is the gentle westerly regional dip of the Palaeozoic sediments of the eastern half of the basin and the gentle dome and basin folding of the western half.

Offshore extensions of the northern part of the Carnarvon Basin have proved to be economically important, for it is here that the Barrow Island Oilfield is situated. A number of Permian to Recent epicontinental basins lie offshore between the coast and the edge of the Continental Shelf, extending north from North West Cape to the Browse Basin. It is in this area that the rich gas fields (North Rankin, Goodwyn and Angel) of the North West Shelf are situated. These major gas/condensate discoveries, shown in the accompanying sketch maps, were made in the period 1971-3. North Rankin is the largest and with estimated reserves of 242,700 million cubic metres of gas and 29 million cubic metres of condensate is the first field planned for development. Total proved and probable recoverable reserves of the four potentially economic fields are estimated at more than 410,000 million cubic metres of gas and 57 million cubic metres of condensate. Current major exploration interest in the Carnarvon Basin is now centred on the Exmouth Plateau, west of the Rankin Platform, but no finds have resulted

to date. This is a major faulted uplift, in water 800 to 2,000 metres deep, and the stratigraphy resembles that of the Rankin Platform.



Oil and gas discoveries and bathymetry of the North-West Shelf (above) and the offshore northern Carnarvon Basin (below) (from Playford, in Prider 1979, by courtesy University of Western Australia Press).



The *Perth Basin* (formerly called the Coastal Plain Artesian Basin) is a narrow elongated basin on the western border of Western Australia extending from Geraldton in the north to Cape Leeuwin in the south. At Geraldton it is about fifty kilometres wide and is flanked both to the west and east by Precambrian crystalline rocks (mainly gneisses). The maximum width of the basin is approximately eighty kilometres at Watheroo and it narrows again to the south being approximately fifty kilometres wide in the sunkland between Busselton and Augusta. At this southern end it is again flanked both to the east and west by Precambrian rocks. The surface of the basin is mostly covered by Recent sands but occasional outcrops of rocks as old as the Permian occur in places. The only evidence available regarding the structure, thickness and age of the sediments in the basin is that provided by geophysical surveys, some deep bores sunk in the search for oil and a number of water bores up to 730 metres deep in the metropolitan area. Gravity surveys indicate that there is a very considerable thickness of sediments, perhaps exceeding 9,000 metres, and it is probable that in this basin we have a complete succession from the Younger Proterozoic (*Cardup Group*), which outcrops along the Darling Scarp, to the Recent sands. Other than the Proterozoic of the Darling Scarp, the oldest sediments exposed are the gently folded Permian marine sediments of the *Eradu* and *Irwin River Basins* at the north end of the main basin. The Permian sediments of the Irwin River area have a total thickness of 1,200 metres and vary from marine glacial beds at the base (as in the Carnarvon and Canning Basins) through fossiliferous marine shales and limestones to lacustrine sandy sediments with coal seams in the upper part of the sequence. Marine and continental Jurassic limestones and sandstones outcrop east of Geraldton and Jurassic beds, overlain by Cretaceous chalks and greensands, occur near Gingin and Dandaragan. In the southern part of the Perth Basin the oldest rocks exposed (if we except the Permian of the separate minor *Collie Basin* which is situated well to the east of the Darling Scarp in a glacially-gouged trough) are the Cretaceous *Donnybrook Sandstones*.

In the vicinity of Perth, artesian bores to a maximum depth of 730 metres expose a sequence varying from Jurassic sandstone at depth, through Cretaceous and Paleocene shales. The *King's Park Shale* of Paleocene (older Tertiary) age is overlain by Pleistocene aeolian sandstones of the *Coastal Limestone Formation*, the base of which is approximately thirty metres below sea-level. There is therefore a big gap in the succession here between the Paleocene and Pleistocene. Many boreholes have been sunk in the north-central part of the basin in the course of oil search operations. Boreholes near the coast (at Jurien Bay and Beagle Ridge) struck Precambrian crystalline basement rocks at comparatively shallow depths of 1,024 metres and 1,481 metres. The sediments thicken further inland, as evidenced by the increasing depth to the Precambrian basement in Cadda No. 1 (2,744 metres), Woolmulla No. 1 (2,810 metres) and Arrowsmith No. 1 (3,420 metres). Very thick sedimentary sequences have been disclosed by Eneabba Bore No. 1 (which bottomed in Lower Triassic at 4,179 metres) and Gingin No. 1 (in Lower Jurassic at 4,544 metres). Some deep wells have been drilled to the south of Perth, namely Pinjarra No. 1 which bottomed in Upper Triassic sandstone at 4,572 metres; in the far south (near the south coast), Sue No. 1 which encountered Precambrian granulites at 3,054 metres; near Perth, Cockburn No. 1 which was abandoned at 3,054 metres in Lower Jurassic sandstone; Whicher No. 1, near Busselton, which reached a depth of 4,653 metres in Permian sandstone before being abandoned; and Blackwood No. 1, abandoned at 3,334 metres in Permian sediments. The first offshore well in the Perth Basin (Quinns No. 1), spudded in on 10 October 1968 at a location approximately thirty-two kilometres north of Rottnest Island, was drilled to a depth of 2,209 metres without finding hydrocarbons. Some oil was found in a second offshore well (Gage Roads No. 1), drilled to a depth of 3,660 metres, approximately fourteen kilometres north-west of Rottnest Island.

Oil search operations in the Perth Basin have led to the discovery of significant oil and gas in the vicinity of Dongara near the northern end of the Basin and gas at Gingin, about eighty kilometres north of Perth. These discoveries, now proved as gasfields, are supplying natural gas

to the metropolitan area and industrial areas south as far as Pinjarra. In late 1980 there were significant gas finds at Woodada, approximately fifty kilometres north-west of Eneabba, and these are presently under evaluation. The other materials of economic significance in the Basin are coal, groundwater, limestone from the Pleistocene Coastal Limestone which is used as a source of lime and as building stone ('Cottesloe Stone'), and sand and clays for building materials. In addition, the Coastal Limestone contains picturesque caves of tourist attraction such as those of Yanchep, Yallingup and Margaret River.

The only evidence of igneous activity in the Basin is the Cretaceous basalt of the sunkland between Bunbury and Cape Gosselin on the south coast.

Very little is known about the structure of this basin. It is bounded to the east by a large fault or monoclinal fold. The evidence available indicates that the main structural character of the deeper part is a regional dip to the east (of 15° to 20°) traversed by north-south trending faults with down-throws to the west. There is an unconformity (Upper Jurassic to Lower Cretaceous) at a depth of approximately 600 metres above which the Cretaceous and Tertiary sediments are almost horizontal.

The *Eucla Basin* occupying the Nullabor Plain, in the south-eastern corner of the State, is occupied at the surface by marine fossiliferous Middle Tertiary (Miocene) limestones with a marginal belt of Lower Tertiary (Eocene) limestones. The Tertiary rocks lie on sandstones and shales of probable Cretaceous age, which in turn overlie the Precambrian crystalline rocks. Little is known of the details of the stratigraphy and structure of the Eucla Basin since the beds are very flat-lying and have only been penetrated by water bores in a few places such as Madura near the coast and Loongana on the Trans-Australian Railway. The Madura bore is artesian but bores along the Trans-Australian Railway have only yielded sub-artesian water (*i.e.* the water will rise under pressure only part of the way to the surface). The oil prospects of this basin are poor because of the comparatively small thickness (600 metres) of the sediments and the absence of suitable folded structures to form oil traps.

The *Officer Basin* covers an extensive area of about 300,000 square kilometres in the Eastern Division of the State and extends into South Australia. It consists of Proterozoic sediments with a comparatively thin cover of the order of 1,000 metres of Permian glacial and Cretaceous sediments. One well drilled in this basin in 1966 entered presumed Proterozoic rocks at shallow depth and was abandoned. Since then, there has been no significant exploration and prospects for oil or gas are believed to be very low.

The south coastal area, known as the *Bremer Basin*, has a thin Tertiary sequence of about 200 metres overlying basement Precambrian gneisses and, because of the thin sedimentary sequence and limited area, petroleum prospects are considered to be very poor. There are some early Tertiary brown coal deposits in this basin and exploratory work is now under way to assess their viability.

The *Collie Coal Basin*. Of the minor basins and isolated occurrences of post-Proterozoic sediments, Collie, since it is the only operating coalfield in Western Australia, is the only one which will be considered here. It is situated approximately 160 kilometres SSE from Perth, and has an area of about 260 square kilometres. Actually it is made up of two basins separated by a sub-surface granitic ridge. It is composed of sandstones and shales with interbedded coal seams and is surrounded by Precambrian rocks. The coal measures, of Permian age, are of the order of 600 metres in thickness of which approximately forty metres is coal. The actual contact between the Permian coal measures and the Precambrian granitic basement has nowhere been seen at the surface but has been encountered in deep drill holes in various parts of the Basin. Such drill holes reveal that Permian mudstone containing granite pebbles lies on an ice-planed surface of the Precambrian granitic rocks. This suggests that the Collie Basin, formerly considered to be a block of the Permian downfaulted into the Precambrian basement, is actually a glacially-gouged trough formed by terrestrial glaciation in the Permian and since filled with

Permian lacustrine sediments. Coal occurs at three horizons and the seams, which average two metres in thickness, persist over fairly long distances. From the associated plant fossils these coal measures appear to be comparable in age with those of the upper part of the Permian sequence at the Irwin River near the northern end of the Perth Basin. There is another similar basin, containing Permian coal measures, the *Wilga Basin*, of about fifty square kilometres extent, approximately thirty kilometres SSE of Collie. There may be other small glacially-gouged Permian basins in the southern part of the State, which are yet unknown. [An early history of the discovery of coal and other minerals in the Colony of Western Australia was published in the *Western Australian Year Book* for 1900-01, page 76. See also the history of the Department of Mines in the 1977 Year Book and the special article on Collie in Chapter VIII, Part 2 of this issue. Ed.]

The Superficial Deposits

Over a great part of the State fresh rock outcrops are comparatively sparse. Most of the country is covered by highly-weathered rocks, laterite, drift sand, soils, and, in the arid salt lake country, by calcrete and thin evaporite deposits.

Laterite. In the southern half of the State the remnants of the Darling Plateau are covered by a thin layer up to three to five metres thick of a reddish-brown rock composed of spherical pebbles tightly or loosely cemented together by a lighter-coloured earthy matrix. This material in its poorly consolidated state is popularly referred to as 'ironstone gravel' and when strongly cemented as 'ironstone'. This rock, called laterite, although it covers large areas, is purely superficial and wells or bores sunk in it pass within a few metres into highly weathered country rock which may extend down for distances up to thirty metres before encountering fresh unweathered rock. This laterite crust and the underlying highly weathered country rock were developed on a gently undulating surface during a period of warmer, more humid, climatic conditions. These tropical conditions probably existed in Late Tertiary (Pliocene) times when a great part of Western Australia had been reduced by long-continued erosion to a peneplain lying close to sea-level, or soon after, when this peneplain had been uplifted to form the *Darling Plateau*. This uplift, judged by the elevation of the laterite-capped hills and the occurrence of fossiliferous marine Eocene sediments 270 metres above sea-level at Norseman, was of the order of 300 metres. On the Great Plateau, remnants of this Darling Plateau are evidenced by the table-topped hills so characteristic of much of the Plateau country. The significance of the laterite profile and the soils developed from the laterite and associated weathered rocks has already been mentioned. Economically, the laterite is important for road-making materials and in a few places (such as Wundowie) as an iron ore. The main constituents of the laterite are the insoluble products of intense rock weathering — iron oxide, alumina and silica. In many places the alumina content is sufficiently high to call them bauxite. Bauxites are the main source of aluminium, and the bauxitic laterites of the Jarrahdale and Del Park-Huntly areas in the Darling Range near Perth are being exploited as aluminium ore. Other bauxite deposits near Wagerup are now being developed for mining. Potentially economic bauxite deposits also occur immediately east of the Darling Range about 130 kilometres SSE of Perth at Mount Saddleback and Boddington.

The mid-Tertiary land surface of the southern half of Western Australia on which the laterite profile was developed at a time when this country was subjected to a tropical climate extends into the northern part of the State. In the Hamersley Iron Province of the North-West Division this old land surface truncated the Lower Proterozoic banded iron formations of the Hamersley Group. At and below this old land surface (the *Hamersley Surface*) which can be traced without tectonic break from sea-level to elevations of 1,200 metres, there was a secondary concentration of the iron of the Lower Proterozoic rocks resulting in extensive rich iron-ore deposits which make this area one of the richest iron provinces in the world. Some of the iron ore deposits, such as the pisolitic limonite deposits capping mesas along the Robe River, are iron-

rich laterites. Such deposits have been mined at Pannawonica, and extensive unexploited deposits occur at Deepdale, further downstream.

In the far south-west of the State sub-surface hard pan formations consisting of ferruginous sandstone are a potential source of low-grade iron ore.

Soils and drift sands. Western Australia, an area of 2,525,500 square kilometres extending from lat. 13° 44' S to lat. 35° 08' S, although having little variety in its broad physical features, has very considerable variation in climates from the tropical areas of summer rainfall in the north through a central and inland province of low rainfall to the temperate areas of winter rainfall in the south. Moreover, throughout this enormous area there is very considerable variation in the nature of the country rocks. The nature of the soils developed is dependent on these two factors — climate and parent rock — so it will be apparent that there will be very considerable variation in the soils over this extensive area. L. J. H. Teakle has recognised the following major soil zones of Western Australia:

1. Grey, yellow and red podsolised, or leached, soils of the temperate sclerophyll forests.
2. Red-brown earths of the eucalyptus-acacia woodlands.
3. Grey and brown calcareous, solonised soils of the low rainfall eucalyptus woodlands — ('mallee' soil zone of Prescott).
4. Red and brown acidic soils of the acacia semi-desert scrub — mulga, etc.
5. Brown acidic soils of the spinifex semi-desert steppes of the north-west.
6. Pinkish-brown calcareous soils of the Nullarbor Plain desert shrub steppes.
7. Pinkish-brown calcareous soils of the acacia semi-desert scrub, mallee and salt bush-blue bush zone.
8. Brown soils of the tropical woodlands, savannahs and grasslands.
9. Red sands of the central desert sandhills — spinifex with desert acacias, desert gums and mallees (*Eucalyptus spp.*).

Each of these major soil zones may be subdivided into one or more soil regions and the reader is referred to a paper 'A Regional Classification of the Soils of Western Australia', by L. J. H. Teakle (*Jour. Roy. Soc. West. Aust. XXIV*, pp. 123-95) for details concerning the soil characteristics of these various zones and regions.

There are considerable areas of Western Australia covered by drift sand which may be in the form of parallel red sand dunes or, in the southern part of the State, extensive sandy plains. The latter have been generally considered to be residual from the weathering of granite and to have suffered little or no transport. These sand plains are often underlain by lateritic material and they probably represent the leached zone of the laterite profile. The youngest of the drift sand deposits are the coastal sand dunes.

Coastal sand deposits are of considerable economic importance. At various places along the south and west coasts there are beach sand deposits in which there is a natural concentration of heavy minerals such as zircon, monazite, xenotime, rutile and ilmenite. Such deposits are at present being exploited at Capel and Bunbury for their ilmenite content, which is valuable because of its low chrome content. The other heavy minerals such as zircon, monazite and xenotime are also being exported overseas. Similar deposits have been discovered at Eneabba (approximately thirty kilometres inland at 240 kilometres north of Perth) — deposits which have been evaluated and are now being exploited.

Many soils are residual accumulations resulting from the weathering of rocks *in situ*. Where the parent rocks contain weather-resistant minerals such as gold and cassiterite, these minerals will be preserved in the residual soils. Such residual accumulations are called eluvial deposits. Most of the so-called 'alluvial' gold deposits of Western Australia are not true alluvials (which are deposits from running water), but are residual eluvial deposits. The distinction between eluvial and alluvial deposits is important in prospecting.

Calcrete. Throughout the arid and semi-arid parts of inland Western Australia, former stream channels are now represented by elongate areas of calcrete deposition or by elongate salt

lakes. Calcrete is chemically-deposited calcium carbonate. These calcretes, because they contain networks of solution channels, have a high permeability and therefore are aquifers in which underground water may occur. Such groundwater has been of considerable significance in the establishment of mining communities in outback arid areas. In calcretes of some areas (such as Yeelirrie, south of Wiluna), uranium deposits have been formed from circulating waters draining areas of weathering Precambrian rocks, mainly granites, which contain small amounts of uranium-bearing minerals. Such secondary uranium deposits are of potential economic significance.

Salt lake deposits. These, together with the coastal sand deposits, represent the youngest of the geological formations developed — indeed they are in course of formation at the present time. They are evaporite deposits resulting from the evaporation of lake waters in the areas of internal drainage. Soluble salts produced by rock weathering are leached out by rain and running water and transported by streams to these lakes. During the long dry summers most of these lakes dry up and the soluble salts are deposited, yielding accumulations of gypsum and common salt. In a few of these inland lakes hydrated potassium aluminium sulphate (alunite), which is a valuable source of potash for fertilisers, has been formed but its actual mode of formation has not yet been satisfactorily explained.

Valuable potash reserves occur at Lake MacLeod, north of Carnarvon. This 2,700-square kilometre coastal lake contains brines rich in potash salts (which are the last salts to crystallise on the evaporation of sea water) saturating the mud of the lake floor. Attempts have been made to exploit these deposits, but to date without success, the only production from Lake MacLeod being sodium chloride.

Solar salt (sodium chloride) is at present being produced at several localities in the north-west, such as Port Hedland, Exmouth Gulf, Lake MacLeod and Shark Bay, where a combination of low-lying flat topography and shallow marine embayments (such as Useless Loop in Shark Bay) with hot dry climate resulting in high evaporation are the ideal conditions for crystallisation of sea water salts. The production of such solar salt amounted to approximately 5.7 million tonnes in 1980-81. In localities such as Shark Bay, where the waters are abnormally saline, other rocks — limestones — are in course of formation. The Shark Bay area has proved a very fruitful area for research on the formation of various limestones and the information being derived from the study of these presently forming rocks has helped in the interpretation of the significance of such deposits which formed in past geological times.

Groundwater. Shallow groundwater, one of the most recent accumulations, has become of major importance in Western Australia, particularly in the arid areas of the developing mining areas of the Pilbara, and in supplementing the surface-conserved waters used in the Perth Metropolitan Area. In the Pilbara, the development of the vast iron ore resources has depended largely on the exploitation of shallow underground water supplies. Port Hedland obtains its water mainly from colluvium beneath the coastal plain, which is periodically replenished by river floods. Other coastal towns obtain their water supplies from Millstream, where a mass of cavernous calcrete, some forty kilometres long and up to twelve kilometres wide, occupying the former course of the Fortescue River, forms a highly productive shallow aquifer. The inland mines and towns of Newman, Pannawonica, Paraburdoo and Tom Price, obtain the bulk of their water from river alluvium and calcrete aquifers, although some groundwater comes from fractured volcanic rocks in some places. In the Perth metropolitan area there are two distinct types of groundwater — the deep, confined, pressure (artesian and sub-artesian) water occurring in Mesozoic bedded sedimentary rocks and shallow unconfined, water-table groundwater in the superficial formations consisting of a complex sequence of sand, limestone and clay up to ninety metres thick. It is the latter type that has been most extensively exploited over recent years by both the Government Water Supply Department and household bores throughout the coastal plain section of the Metropolitan Area.

Conclusion

From the foregoing summary of the geology of Western Australia we see that, although nowhere do we find the complete geological succession, somewhere in the State there are deposits representative of every Period. The geological history of Western Australia begins with the basaltic igneous activity of the Early Archaean some 3,000 million years ago, followed by sedimentation, intense mountain building activity and associated granitisation and granite intrusions. In post-Archaean times there is a record of sedimentation throughout all the main geological periods. Igneous activity ceased in the Lower Palaeozoic and only recurred during the late Mesozoic, yielding the basaltic lavas of the far south-west and the volcanic rocks of the west Kimberley. By mid-Tertiary times much of Western Australia had been reduced by denudation to a gently undulating peneplain land surface on which, under tropical climatic conditions, there was an extensive development of laterite which in places constitutes valuable bauxite and iron-ore deposits. Geological processes are continuing and at the present day rocks and soils are still in the process of formation.

A more complete description of the geology of Western Australia is contained in 'The Geology of Western Australia' (*Geol. Surv. West. Aust. Mem. No. 2, 1975*).

The Mineral Deposits

In the foregoing pages mention has been made in various places of the mineral deposits on which the development of Western Australia has been so dependent. These deposits are directly related to geology — the nature of the rocks and their structural relationships — of the areas in which they occur. One would not, for example, look for coal, oil or natural gas in the crystalline Precambrian Shield, nor for gold or nickel deposits in the sedimentary basins that have been described. Moreover, in spite of the fact that the nickel deposits occur in Older Precambrian rocks, not all of these rocks are potential hosts for nickel deposits — they are only likely to occur in the ultrabasic rocks which constitute a very small fraction of one per cent of the Older Precambrian rocks. The following tabulated statement summarises the sequence of events represented in the geological history of Western Australia and the mineral deposits associated with each. This table, read in conjunction with a geological map of any area, will indicate the economically important deposits which could possibly occur in that particular geological environment.

GEOLOGICAL EVENTS AND MINERAL DEPOSITS IN WESTERN AUSTRALIA (a)

Era	Main geological events	Economic mineral deposits
CAINOZOIC	15. Weathering and erosion (Present day)	Beach sand deposits, salt, gypsum, sands and clays, peat, alluvial and eluvial deposits (gold, tin, diamonds, etc.), groundwater, uranium in calcrete areas.
	14. Sedimentation (Pleistocene and Recent)	Ilmenite and other black sand minerals, limestone
	13. Peneplanation (mid-Tertiary) and laterite formation	Bauxite Iron and manganese ores Alluvial tin and gold Clays
	12. Sedimentation (older-Tertiary)	Artesian water
MESOZOIC	11. Sedimentation (with Cretaceous basalt outflows and Jurassic volcanic pipes)	Artesian water Oil and gas, coal Basalt for aggregate stone Diamonds in Jurassic pipes
PALAEOZOIC	10. Sedimentation, earth movements, periods of erosion	Coal Oil and gas

GEOLOGICAL EVENTS AND MINERAL DEPOSITS IN WESTERN AUSTRALIA (a) — *continued*

Era	Main geological events	Economic mineral deposits
PROTEROZOIC	9. Basic igneous intrusions	Road metal (blue metal) Lead, zinc and copper
	8. Sedimentation and minor granitic magma intrusions	Iron ore (of Yampi Sound) Alluvial gold (of Nullagine and Paterson Range)
	7. Chemical sediments (banded iron formations)	Iron ore and blue asbestos (in Hamersley Basin)
ARCHAEAN	6. Pegmatite and quartz vein formation from end-stages of granitic intrusions	Tin, tantalum, tungsten, beryllium, lithium, uranium minerals. Gold and silver in early Archaean country rocks (1 and 2)
	5. Intrusion of granitic magma (2,700 million years ago)	Aggregate and building stone
	4. Granitisation — conversion of all pre-existing rocks into granitic rocks — contemporaneous with intense folding, fracturing, and metamorphism of pre-existing rocks approximately 3,000 million years ago	Aggregate and building stone
	3. Intrusion of basic magma forming stratiform layered basic/ultrabasic igneous complexes	Nickel, copper and chromium in ultrabasic rocks
	2. Sedimentation with minor periods of acid volcanic activity	Copper in acid volcanics
	1. Eruption of submarine basaltic lavas and chemical deposition of banded ferruginous cherts	Iron ore

(a) A geological map of Western Australia appears at the beginning of this Part.

Current Geological Investigations in Western Australia

While much is known about the geology and mineral resources of Western Australia, there is still much to be learned. The foregoing summary account of the geology of Western Australia is based on work carried out in the past, which has increased in tempo during the last decade because of the discovery of important oil, gas and metal-bearing mineral deposits.

At present, geological work in Western Australia is being carried out by the following bodies.

1. The Geological Survey Branch of the Department of Mines of Western Australia, which is engaged in regional geological mapping, special investigations of varied character concerned with groundwater resources, mineral deposits, and engineering geology problems, and problems arising daily, which require geological advice to the public. The major results of the Geological Survey's operations are published annually in the Annual Report of the Department of Mines of Western Australia, in Bulletins issued at irregular intervals and in four-mile or 1 : 250,000 scale geological maps with explanatory notes, which are also issued at irregular intervals. The initial phase of the 1 : 250,000 scale geological mapping of the entire State has been completed and re-mapping of appropriate areas is now being carried out along with more detailed mapping of economically significant areas on 1 : 100,000 and 1 : 50,000 scales.

2. The Geology Department of the University of Western Australia. Research projects are undertaken by members of staff and research students, varying from mapping and petrological-mineralogical projects concerned with the Precambrian rocks which make up the greater part of the State and their associated ore deposits, through petrological and palaeontological work on rocks from the various sedimentary basins, to studies of present-day marine sedimentation. The results of such investigations are published in various scientific periodicals, both in Australia and overseas.
3. Oil exploration companies. Such companies have carried out geological and geophysical surveys of the various sedimentary basins and some offshore areas, and are presently engaged in deep-drilling programmes. Attention is now being given to drilling in the offshore continental shelf areas of the Bonaparte Gulf, Browse, Canning, Carnarvon and Perth Basins.
4. Mineral exploration companies. Following the discovery of important nickel deposits at Kambalda and Scotia near Kalgoorlie, and, subsequently, at Mount Windarra near Laverton, and other localities, many Australian and overseas exploration companies became engaged in base metal exploration, particularly in the Norseman to Laverton belt of Precambrian greenstones. The phenomenal increase in the price of gold in 1979-80 stimulated exploration in the various greenstone belts in which auriferous deposits are known to occur, and the discovery of diamonds in the Kimberley Division has led to exploration for diamonds throughout the State.

The continued efforts of these institutions and exploration companies are adding much to our knowledge of the geology of the western third of the Australian continent.

Seismicity of Western Australia

It had been generally considered that Western Australia was a stable block free of seismic activity in the form of earthquakes but this idea was shattered by the occurrence, on 14 October 1968, of a major earthquake centred near Meckering, 135 kilometres inland from Perth. This earthquake, of magnitude 6.9 on the Richter Scale, completely wrecked the town and most farm houses in the vicinity; alarmed numerous residents of Perth; caused minor damage to many buildings in the Perth Metropolitan Area; was felt within a radius of about 640 kilometres; and made people realise that Western Australia was not as stable as was previously thought. On 2 June 1979, another earthquake of magnitude 6.0 on the Richter Scale, resulted in the destruction of the small town of Cadoux, 215 kilometres NE from Perth. Other major earthquakes, such as the Meeberrie earthquake of 29 April 1941 (of magnitude 7.5 on the Richter Scale, the most severe earthquake yet recorded on the Australian continent) and the more recent submarine earthquake of 23 April 1979, of magnitude 7 on the Richter Scale, which originated on the edge of the continental shelf about 260 kilometres NNW of Broome, have tended to pass without much notice since they either occurred in less densely populated areas or were of low intensity. Records show (according to Everingham in a report of the Bureau of Mineral Resources, Geology and Geophysics, *Seismicity of Western Australia*) that there were forty-seven Western Australian earthquakes of local magnitude greater than 3.5 (Richter Scale) recorded in the period August 1959 to June 1965, and 210 less intense earthquakes during the same period.

Most of the recorded minor earthquakes have originated in the Yandanooka-Cape Riche belt of country about 480 kilometres long by fifty kilometres wide, which lies just within the western margin of the crystalline Precambrian Shield. Indeed, all except five of the 210 recorded minor earthquakes of the period 1959 to 1965 originated in this narrow belt which is parallel to the regional geological structure of the older Precambrian rocks of the southern half of Western Australia. It was in this belt that the severe earthquakes at Meckering (on 14 October 1968) and Cadoux (on 2 June 1979) had their origin.

The major fault structure of Western Australia is the Darling Fault which forms the western margin of the Precambrian Shield and the eastern margin of the Perth Basin. It extends meridionally from the south coast for about 1,000 kilometres. It is considered that the total west block downward movement on this fault has been of the order of 9,000 metres to 12,000 metres. In spite of the fact that there is a major negative gravity anomaly over the Perth Basin causing this region to be isostatically unbalanced, no earthquakes have been recorded which originated on this fault — indeed there is no geological evidence of any movement on the Darling Fault for a least one million years. The October 1968 movement on the Meckering Fault indicates that the Precambrian Shield is in a state of compression and would support a hypothesis that the Darling Fault, instead of being a westerly-dipping tension structure with downthrow to the west as commonly thought, is more probably an easterly-dipping compression structure with the east (continental) block thrust up over the Perth Basin. This would explain the observed stability of the Perth Basin which should, according to the gravity measurements, be a very unstable area. Instead of rising, as it should because of the major negative gravity anomaly, it is being held down by the overthrust continental block.

As has been indicated, the Meckering earthquake has drawn attention to the possibility of earthquake occurrence in south Western Australia and for the necessity to consider this factor when designing large structures. Calculations have been made from records during the period 1960 to 1969 to give an approximate idea of the order of earthquake frequency in the south-west corner of the State. These have indicated that an earthquake of magnitude greater than 6.5 would occur once every fifty years, and one of magnitude greater than 5.5 every ten years, but these figures are thought to be pessimistic because records kept since 1840 suggest a lower average frequency and the data used for these calculations are swamped by the foreshocks and aftershocks of the Meckering earthquake.

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Chapter II— continued

Part 2 — Climate and Meteorology

(Contributed by the Western Australian Regional Office of the Bureau of Meteorology)

Western Australia is the largest State in the Commonwealth, extending from latitude 13° 30' S to 35° 08' S, and from longitude 113° 09' E to 129° E. It stretches a distance of about 2,400 kilometres in a north-south direction and about 1,600 kilometres west-east. A little more than one-third of the State lies within the tropics, while the remainder extends southward to the temperate zone.

Because of its large size and its latitudinal position, Western Australia has entirely different climates in its northern and southern parts, while in the central regions there is a gradual change from the tropical climate of the north to the typical Mediterranean climate of the south.

Most of the State is a plateau between 300 and 600 metres above mean sea-level and there are no outstanding mountain ranges. Where the edge of the plateau forms the Darling Range along the southern part of the west coast, it exerts a marked influence on the rainfall, causing a rapid increase from the coastal plain to the higher land. Elsewhere the effect of topography is less marked and its main influence is seen in the general decrease of rainfall with increasing distance from the coast.

PRESSURE SYSTEMS

Weather during the year is controlled largely by the movement of the anticyclonic belt (high pressure systems with anti-clockwise winds) which lies in an east-west direction across the continent for about six months of the year.

In winter this system moves northward, bringing clear skies with fine sunny days and easterly winds to the tropics. With this northward movement, westerly winds on the southern side of the anticyclones extend over the southern part of the State, bringing with them cool cloudy weather and rain. In mid-winter the northern fringe of the 'Roaring Forties' extends to Western Australia and there are frequent westerly gales in the south coastal belt.

These westerly winds are maintained by a series of depressions (low pressure systems with clockwise winds), which move eastward well south of the Western Australian coast, and others which originate in the Indian Ocean and move south-eastward past Cape Leeuwin. The extent to which westerlies affect the State depends largely on the intensity and the position of these depressions.

Towards the end of winter the anticyclonic belt moves southward, and the westerlies are confined more to the lower south-west and the south coastal districts. By summer the anticyclonic belt has moved so far south that its axis is off the south coast and easterly winds prevail over most of the State.

During this summer period the midday sun is at a high elevation in the tropics and the continual heating leads to the development of a monsoonal depression over this region. Wind circulation round this system causes easterlies on its southern or inland side, but in the coastal districts north-east from Onslow, and in parts of the Kimberley, westerlies prevail. Winds in both the north and the south of the State are then in the opposite direction to those prevailing during the winter.

As the sun moves northward again the anticyclonic belt follows it. The monsoonal depression over the tropics dissipates and westerlies again gradually extend northward to the southern part of the State.

During the northern 'Wet' season (from about December to March), occasional cyclones, known locally as 'willy willys', bring strong winds and rain to the tropics. They originate generally in the Timor Sea or off the north-west coast and often move first in a south-westerly direction parallel to the coast and later in a south-easterly direction.

They frequently move inland between Broome and Onslow but occasionally travel further westward before curving to the south-east and moving inland over the west coast. Others fade out at sea without ever crossing the coast. Those that move inland usually commence to dissipate soon after crossing the coast, but occasionally they move right across the State, passing into the Southern Ocean and moving off towards Tasmania.

These storms are often extremely violent and have on occasions almost completely wrecked towns on the north-west coast, while a cyclone which struck a pearling fleet off the Eighty Mile Beach in 1887 caused the loss of twenty-two vessels and 140 lives.

However, despite the damage which they cause, the storms are of great benefit to the pastoral regions on account of the heavy and widespread rain which generally accompanies them. The heaviest fall ever recorded in one day in Western Australia, 747 millimetres, was received at Whim Creek from a cyclone in 1898.

RAINFALL

The moist rain-bearing winds in this State are in general from a westerly direction. The easterlies, having come from the dry inland parts of Australia, usually bring fine weather and clear skies.

Because of this the highest rainfall occurs in the winter months in the south of the State, and in the summer months in the north. In between these areas there is a gradual change from one rainfall regime to the other.

From the map showing the wettest six-monthly period of the year, it can be seen that the summer rainfall area extends southward from the Kimberley to the Trans-Australia Railway, where there is a rapid change to the winter rainfall regime of the south coast. However, the difference between summer and winter totals decreases southward, and the southern part of this region is one of almost uniform average rainfall.

Proceeding northward from the winter rainfall area of the south-west of the State, the wet period occurs earlier during the year. Across a belt Carnarvon-Menzies-Eucla, there is a more rapid change, and this belt divides the winter rainfall area from that which receives most of its rain in the first six months of the year. Further north, the change is more gradual but continuous and in the Kimberley most of the year's rainfall is received in the summer months which, in the southern parts of the State, are the driest of the year.

The mean annual rainfall for Western Australia is shown on the map later in this Part.

The following table shows the average rainfall and number of wet days, the highest and lowest monthly totals, and the highest daily fall for various centres.

RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS

(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
COASTAL													
Wyndham — (New site) (a)													
Rainfall — Average (mm)	146	214	179	29	15	8	1	0	12	19	51	95	769
Highest (mm)	717	523	447	515	88	120	133	21	35	85	142	292	1,431
Lowest (mm)	0	14	0	0	0	0	0	0	0	0	1	7	365
Highest one day (mm)	81	74	141	74	48	4	49	0	78	28	84	46	141
Wet days — Average number	13	15	12	3	1	0	0	0	1	4	5	10	64

(a) Commencing with Year Book No. 21 — 1983 figures relate to reporting station on a new site.

RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
<i>COASTAL — continued</i>													
<i>Broome —</i>													
Rainfall — Average (mm)	167	159	94	26	35	21	6	2	2	2	9	37	560
Highest (mm)	825	427	439	226	176	208	72	23	24	28	50	279	1,228
Lowest (mm)	7	8	1	0	0	0	0	0	0	0	0	0	139
Highest one day (mm)	351	151	204	107	119	127	55	9	13	15	37	210	351
Wet days — Average number	11	11	8	3	3	2	1	1	1	1	1	5	48
<i>Port Hedland —</i>													
Rainfall — Average (mm)	59	89	46	23	31	20	9	5	1	1	3	21	308
Highest (mm)	454	360	251	352	170	125	81	35	4	8	67	219	627
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	47
Highest one day (mm)	387	329	152	111	156	53	46	22	3	7	59	169	387
Wet days — Average number	5	7	4	2	3	3	2	1	1	1	1	2	32
<i>Roebourne —</i>													
Rainfall — Average (mm)	66	62	68	31	29	30	14	6	1	1	2	10	320
Highest (mm)	368	325	408	552	225	309	135	98	40	31	31	129	1,060
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	3
Highest one day (mm)	213	169	234	146	168	134	57	44	23	29	17	97	234
Wet days — Average number	3	4	3	1	3	3	2	1	0	0	0	1	22
<i>Onslow —</i>													
Rainfall — Average (mm)	25	46	51	20	43	42	18	9	1	1	2	3	261
Highest (mm)	261	539	415	279	259	183	222	107	25	27	56	61	999
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	15
Highest one day (mm)	158	356	283	157	117	111	76	62	17	21	30	38	356
Wet days — Average number	3	3	3	2	4	4	2	2	1	0	0	1	25
<i>Carnarvon —</i>													
Rainfall — Average (mm)	15	23	15	12	41	48	49	18	5	6	4	1	237
Highest (mm)	157	149	93	89	195	161	180	51	19	38	81	4	556
Lowest (mm)	0	0	0	0	0	1	0	0	0	0	0	0	75
Highest one day (mm)	52	78	77	76	95	96	82	35	11	25	81	4	96
Wet days — Average number	2	3	2	3	6	7	8	5	3	3	1	1	44
<i>Geraldton —</i>													
Rainfall — Average (mm)	7	12	13	27	74	113	99	66	31	19	8	6	475
Highest (mm)	53	131	89	100	282	286	243	131	81	109	47	59	843
Lowest (mm)	0	0	0	1	0	34	32	11	0	0	0	0	220
Highest one day (mm)	36	69	88	48	62	109	72	59	39	71	17	51	109
Wet days — Average number	2	2	3	7	10	15	15	13	9	7	4	2	89
<i>Perth — Bureau —</i>													
Rainfall — Average (mm)	8	12	20	45	124	183	174	137	80	55	21	14	873
Highest (mm)	55	166	145	149	308	476	425	318	199	200	71	81	1,338
Lowest (mm)	0	0	0	0	14	55	62	12	9	1	0	0	509
Highest one day (mm)	55	87	77	67	76	99	76	74	47	50	39	47	99
Wet days — Average number	3	3	4	7	14	17	18	17	14	11	6	4	118
<i>Bunbury —</i>													
Rainfall — Average (mm)	11	11	23	46	132	183	174	126	82	55	25	14	882
Highest (mm)	86	103	91	175	288	412	417	302	201	195	84	80	1,365
Lowest (mm)	0	0	0	0	10	73	49	21	0	5	0	0	484
Highest one day (mm)	66	86	66	61	79	82	95	62	58	39	38	27	95
Wet days — Average number	3	2	4	8	14	18	20	18	14	11	6	4	122
<i>Albany —</i>													
Rainfall — Average (mm)	20	24	27	71	102	102	126	108	85	87	45	28	825
Highest (mm)	68	62	85	127	192	224	204	174	133	172	117	97	966
Lowest (mm)	3	4	7	41	54	45	55	52	43	38	6	5	628
Highest one day (mm)	43	36	33	52	40	38	43	44	44	53	28	19	53
Wet days — Average number	8	8	11	15	18	18	22	21	19	16	12	10	178
<i>Esperance — M.O. (b)</i>													
Rainfall — Average (mm)	13	31	24	61	84	87	97	86	64	51	39	18	655
Highest (mm)	133	120	125	176	179	274	240	211	174	146	145	81	1,003
Lowest (mm)	0	0	0	2	20	28	24	19	11	13	0	0	438
Highest one day (mm)	17	38	31	23	51	34	45	28	28	19	24	21	51
Wet days — Average number	6	6	7	12	14	17	17	18	15	13	12	6	143

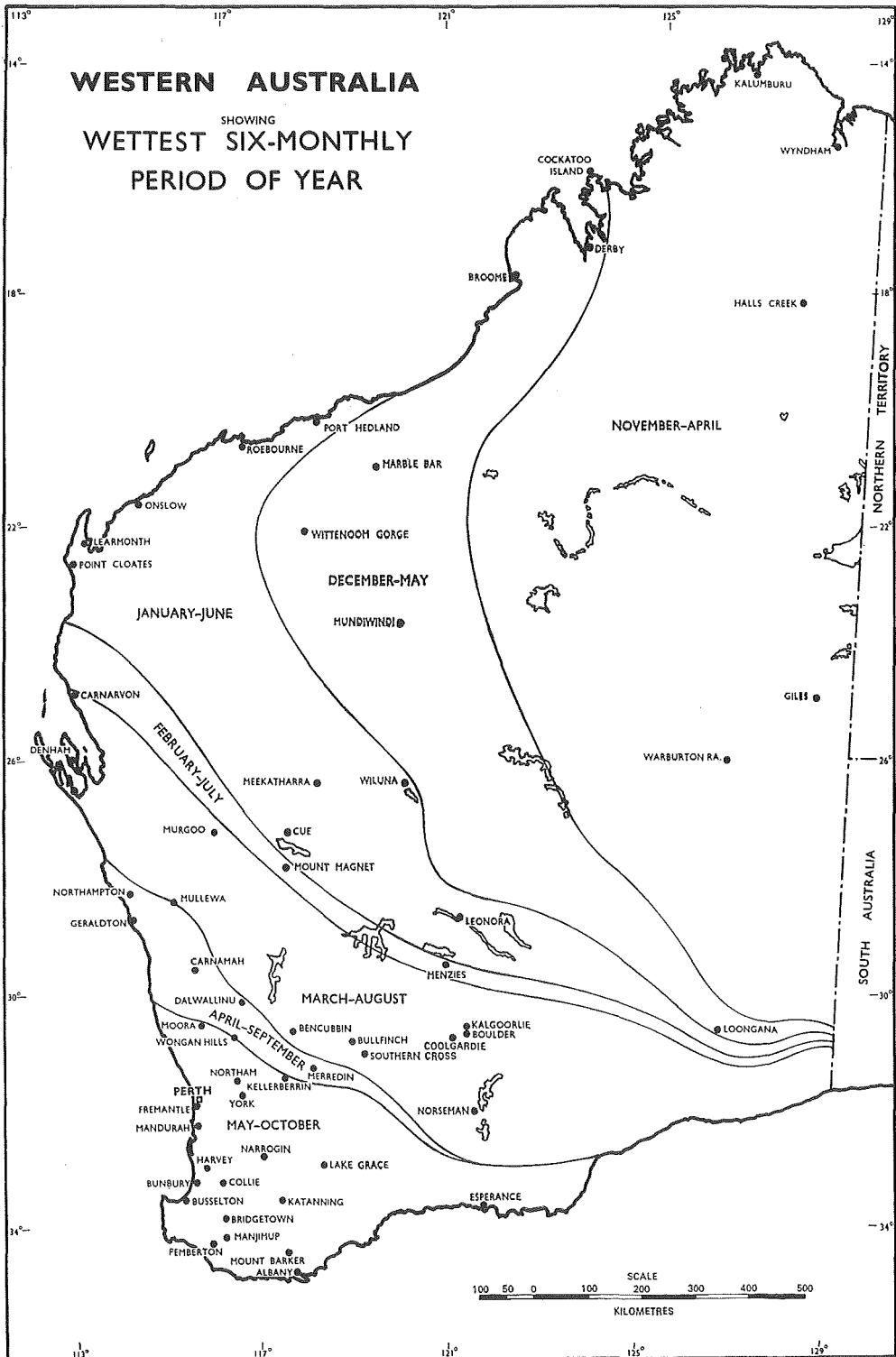
(b) *M.O.* denotes Meteorology Office.

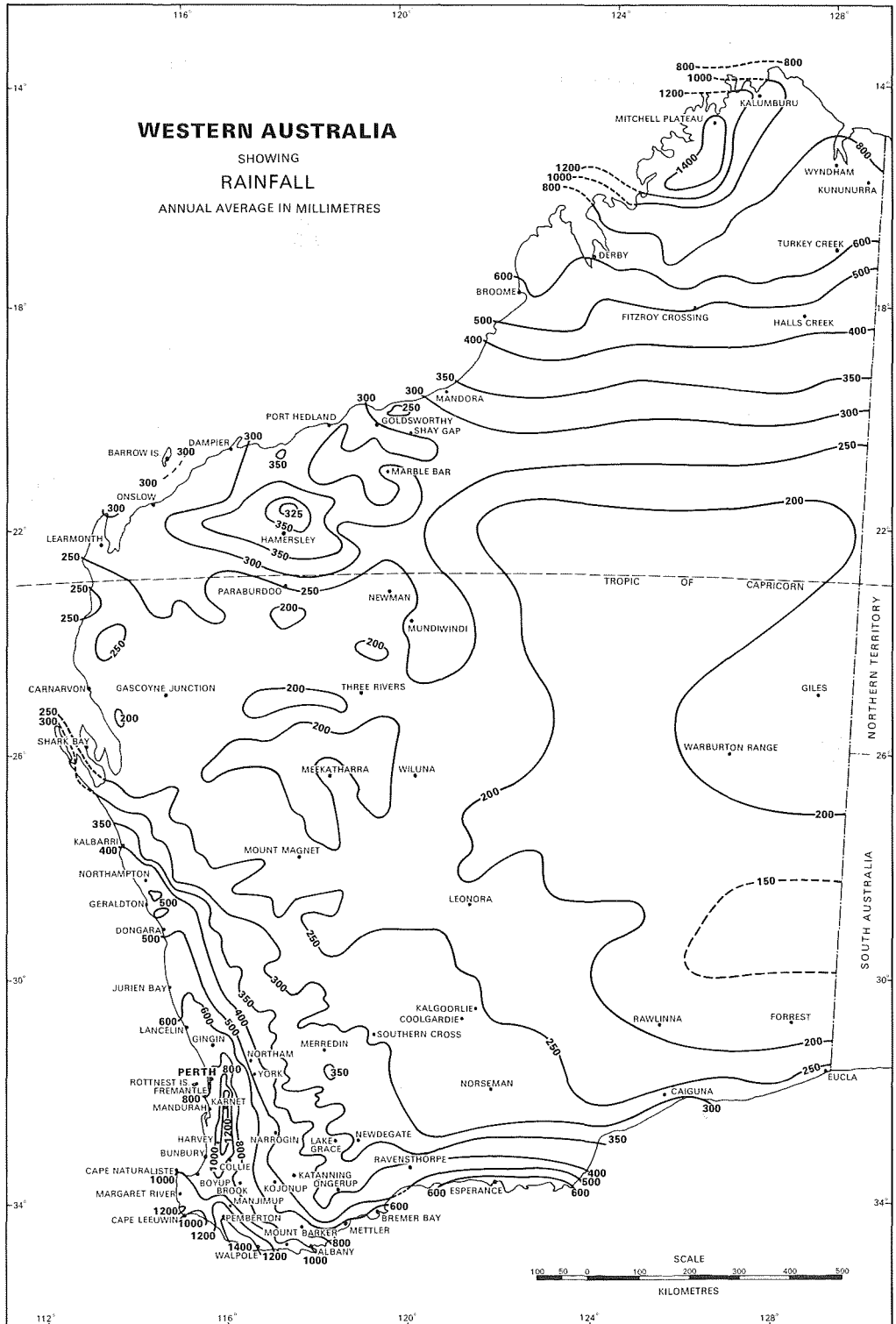
RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
COASTAL — <i>continued</i>													
<i>Eucla</i> —													
Rainfall — Average (mm)	14	16	20	27	33	26	24	25	20	18	17	13	253
Highest (mm)	95	182	127	205	104	155	62	82	85	74	67	116	453
Lowest (mm)	0	0	0	0	0	2	0	2	1	1	0	0	52
Highest one day (mm)	54	115	51	41	75	36	26	31	40	33	74	49	115
Wet days — Average number	3	4	5	7	10	9	10	9	8	6	5	4	80
WHEAT BELT													
<i>Carnamah</i> —													
Rainfall — Average (mm)	11	15	22	24	52	82	71	54	29	18	10	9	397
Highest (mm)	103	103	180	121	170	231	188	192	84	73	91	56	782
Lowest (mm)	0	0	0	0	2	21	14	12	1	0	0	0	204
Highest one day (mm)	97	78	153	89	74	61	43	79	33	40	71	50	153
Wet days — Average number	2	2	3	6	8	13	14	11	8	6	3	2	78
<i>Wongan Hills</i> —													
Rainfall — Average (mm)	11	16	21	24	54	79	70	52	27	20	10	9	393
Highest (mm)	70	111	166	81	188	220	174	131	97	66	43	59	675
Lowest (mm)	0	0	0	0	0	17	8	8	2	0	0	0	161
Highest one day (mm)	69	80	81	62	64	70	41	34	37	36	32	57	81
Wet days — Average number	2	2	3	5	8	12	13	11	7	6	3	2	74
<i>Kellerberrin</i> —													
Rainfall — Average (mm)	11	14	22	23	43	58	54	42	27	20	11	13	338
Highest (mm)	87	127	152	110	119	163	123	100	76	77	68	67	661
Lowest (mm)	0	0	0	0	0	15	11	3	2	0	0	0	172
Highest one day (mm)	52	108	103	58	41	53	38	40	24	37	33	57	108
Wet days — Average number	2	2	4	5	8	12	13	11	8	6	3	2	76
<i>Southern Cross</i> —													
Rainfall — Average (mm)	14	20	22	22	33	41	39	30	19	16	14	11	281
Highest (mm)	113	137	169	128	119	183	107	88	106	79	75	72	577
Lowest (mm)	0	0	0	0	0	5	11	1	0	0	0	0	118
Highest one day (mm)	63	84	61	44	55	43	36	31	25	55	51	40	84
Wet days — Average number	3	3	4	5	8	10	11	9	6	5	3	2	69
<i>Merredin</i> —													
Rainfall — Average (mm)	12	14	22	24	41	54	54	39	26	20	13	13	332
Highest (mm)	77	80	161	114	132	135	127	86	86	75	69	93	565
Lowest (mm)	0	0	0	0	1	6	9	1	0	0	0	0	130
Highest one day (mm)	66	66	83	60	49	59	45	34	45	30	37	49	83
Wet days — Average number	2	2	4	5	8	11	13	10	7	5	3	2	72
<i>Northam</i> —													
Rainfall — Average (mm)	8	12	19	24	57	84	86	63	37	26	10	9	436
Highest (mm)	56	190	189	88	148	233	221	170	129	100	41	66	711
Lowest (mm)	0	0	0	0	1	10	20	3	3	0	0	0	194
Highest one day (mm)	41	116	126	75	65	67	51	33	31	58	32	50	126
Wet days — Average number	2	2	3	6	10	15	16	14	11	8	4	2	93
<i>Wandering</i> —													
Rainfall — Average (mm)	9	14	22	35	81	120	118	94	63	45	18	14	633
Highest (mm)	56	244	122	121	195	368	324	270	192	129	65	106	1,051
Lowest (mm)	0	0	0	0	11	25	34	14	8	1	0	0	297
Highest one day (mm)	49	138	104	51	61	85	69	53	40	43	48	64	138
Wet days — Average number	3	3	5	7	13	16	18	16	14	11	6	4	116
<i>Narrogin</i> —													
Rainfall — Average (mm)	10	17	22	30	67	93	90	69	47	35	16	12	508
Highest (mm)	69	237	128	121	167	300	243	185	121	123	77	95	741
Lowest (mm)	0	0	0	0	10	25	25	16	7	2	0	0	269
Highest one day (mm)	50	115	114	63	68	71	81	42	36	38	38	50	115
Wet days — Average number	2	3	4	6	11	14	16	13	11	8	5	2	95
<i>Katanning</i> —													
Rainfall — Average (mm)	11	16	24	32	62	81	78	63	46	38	20	16	487
Highest (mm)	87	225	134	162	148	214	174	173	123	115	98	74	782
Lowest (mm)	0	0	0	1	7	21	22	13	4	5	0	0	273
Highest one day (mm)	64	126	70	106	59	70	38	44	37	50	55	55	126
Wet days — Average number	3	4	4	7	13	16	18	16	13	11	6	4	115

RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
OTHER INLAND													
<i>Halls Creek</i> —													
Rainfall — Average (mm)	146	120	57	22	14	5	7	3	5	16	30	68	493
Highest (mm)	501	369	163	162	105	87	69	49	85	87	175	208	791
Lowest (mm)	14	3	2	0	0	0	0	0	0	0	1	4	250
Highest one day (mm)	202	124	95	88	62	36	48	42	37	30	97	120	202
Wet days — Average number	13	11	8	3	2	1	1	1	1	3	6	10	60
<i>Marble Bar</i> —													
Rainfall — Average (mm)	71	74	54	20	24	25	11	5	1	4	9	36	334
Highest (mm)	310	235	389	241	187	165	134	35	14	116	62	243	742
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	72
Highest one day (mm)	152	121	305	125	91	105	63	32	24	84	61	150	305
Wet days — Average number	7	7	4	2	2	2	2	1	0	1	2	4	34
<i>Mundiwindi</i> —													
Rainfall — Average (mm)	46	42	46	22	21	21	9	8	3	7	11	26	262
Highest (mm)	321	325	267	180	121	205	70	53	61	93	71	160	816
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	26
Highest one day (mm)	133	147	175	80	56	123	43	39	34	53	58	114	175
Wet days — Average number	6	5	5	3	3	3	2	2	1	1	3	4	38
<i>Warburton Range</i> —													
Rainfall — Average (mm)	24	27	22	22	20	20	11	11	4	11	17	24	213
Highest (mm)	177	149	181	111	91	99	54	72	25	102	83	95	691
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	35
Highest one day (mm)	58	78	101	77	66	42	22	50	24	45	47	61	101
Wet days — Average number	3	3	3	3	4	3	2	2	1	2	3	4	33
<i>Meekatharra</i> —													
Rainfall — Average (mm)	29	30	26	15	23	29	24	12	4	5	10	8	215
Highest (mm)	129	142	166	65	72	156	166	56	21	18	94	25	420
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	66
Highest one day (mm)	103	57	54	37	37	61	62	23	13	25	82	24	103
Wet days — Average number	5	4	4	4	5	7	6	3	2	1	2	3	46
<i>Laverton</i> —													
Rainfall — Average (mm)	22	22	32	21	23	23	14	13	6	7	14	15	212
Highest (mm)	142	144	122	205	124	126	66	85	67	50	152	152	452
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	66
Highest one day (mm)	75	87	67	54	52	40	21	41	44	49	91	71	91
Wet days — Average number	3	3	4	3	5	5	4	3	2	2	3	3	40
<i>Kalgoorlie</i> —													
Rainfall — Average (mm)	22	31	21	22	25	31	26	19	15	14	15	12	253
Highest (mm)	186	308	143	99	110	186	83	65	98	70	70	41	488
Lowest (mm)	0	0	0	0	0	2	5	4	0	0	0	0	108
Highest one day (mm)	154	178	70	50	45	57	28	40	44	26	77	25	178
Wet days — Average number	3	4	4	6	7	9	9	7	6	4	4	3	66
<i>Rawlinna</i> —													
Rainfall — Average (mm)	14	17	18	18	17	19	14	16	13	14	13	13	186
Highest (mm)	210	123	85	114	81	131	58	155	85	64	81	117	497
Lowest (mm)	0	0	0	0	0	0	0	0	0	0	0	0	79
Highest one day (mm)	100	73	48	58	31	38	25	66	72	31	65	49	100
Wet days — Average number	2	3	3	3	5	5	5	4	4	3	3	3	43
<i>Collie</i> —													
Rainfall — Average (mm)	14	15	25	50	133	189	188	145	101	71	30	16	977
Highest (mm)	85	178	105	183	270	474	440	414	249	213	90	81	1,467
Lowest (mm)	0	0	0	4	15	58	52	31	15	2	1	0	605
Highest one day (mm)	74	106	84	63	62	91	69	73	58	49	36	32	106
Wet days — Average number	4	3	5	10	17	20	22	20	17	14	8	5	145
<i>Manjimup</i> —													
Rainfall — Average (mm)	20	20	32	65	142	180	183	149	109	82	46	26	1,054
Highest (mm)	92	117	138	194	269	332	320	323	257	165	122	78	1,761
Lowest (mm)	0	0	1	9	26	86	43	49	24	9	3	0	650
Highest one day (mm)	79	44	89	77	79	83	50	54	59	53	49	32	89
Wet days — Average number	5	5	7	11	17	20	21	20	16	14	10	7	153





RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
OTHER INLAND — <i>continued</i>													
<i>Pemberton</i> —													
Rainfall — Average (mm)	21	19	39	83	162	208	230	167	120	95	57	38	1,239
Highest (mm)	80	86	128	213	337	365	391	388	214	189	158	92	1,712
Lowest (mm)	1	1	5	10	36	118	130	84	45	13	6	3	802
Highest one day (mm)	60	30	77	53	77	59	68	51	45	44	45	42	77
Wet days — Average number	7	6	8	12	18	20	22	20	18	16	12	9	168
<i>Mount Barker</i> —													
Rainfall — Average (mm)	22	24	36	58	86	98	108	94	82	73	42	30	753
Highest (mm)	179	179	129	234	243	209	261	173	157	160	155	87	1,095
Lowest (mm)	1	1	4	4	16	43	22	33	18	16	3	1	431
Highest one day (mm)	105	72	57	139	69	68	72	48	45	54	64	44	139
Wet days — Average number	8	7	10	13	17	19	21	20	18	16	11	9	169

ANNUAL RAINFALL AT REPRESENTATIVE STATIONS
(Millimetres)

Station	1976	1977	1978	1979	1980	1981	Long-term average (a)
Albany (M.O.)	966	796	961	812	728	812	809
Broome (M.O.)	945	298	1,216	339	745	907	537
Bunbury	857	653	800	608	831	796	882
Carnamah	221	251	487	204	(b)	405	397
Carnarvon (M.O.)	139	174	188	87	323	181	248
Collie	764	751	790	637	(b)	948	985
Esperance (M.O.)	637	520	561	706	564	555	675
Eucla	(b)	274	378	254	275	375	252
Geraldton (M.O.)	281	320	560	431	366	480	482
Giles (M.O.)	159	190	272	245	277	239	235
Halls Creek (M.O.)	496	632	538	357	769	619	489
Kalgoorlie (M.O.)	129	154	211	187	321	307	263
Katanning	480	406	382	340	471	399	491
Kellerberrin	286	209	292	263	196	346	339
Leonora	101	170	256	225	361	206	216
Manjimup	1,022	898	1,053	894	924	1,153	1,053
Marble Bar	345	338	467	393	798	390	333
Meekatharra (M.O.)	139	70	170	114	302	161	229
Merredin	310	216	462	305	212	367	331
Mount Barker	745	701	767	771	676	637	756
Narrogin	468	448	550	375	537	513	509
Newman	136	169	400	406	483	281	317
Northam	437	323	372	(b)	291	503	435
Onslow	209	181	179	126	537	255	265
Pemberton	1,124	1,008	1,168	1,011	1,115	1,251	1,245
Perth (Bureau of Meteorology)	711	608	923	560	847	848	873
Port Hedland (M.O.)	258	322	411	178	479	376	304
Rawlinna	118	77	259	150	196	213	188
Roebourne	291	196	316	116	357	373	321
Southern Cross	201	238	381	200	246	337	281
Wandering	571	480	563	406	612	544	636
Wongan Hills	387	261	354	293	265	439	397
Wyndham	607	846	674	(b)	922	854	692

(a) Number of years of record used to calculate the long-term average varies from station to station. (b) Records incomplete. Note: (M.O.) denotes (Meteorology Office).

TEMPERATURE

The hottest month in Western Australia is November in the Kimberley, December a little further south and January near the Tropic of Capricorn. In the tropics temperatures generally rise from July, the coldest month, to November. In some places further rises occur, but in others the onset of the 'Wet' prevents this further rise and there is a slight fall. As the rains cease at these latter places temperatures commence to rise again and there is another minor peak in March or April. After this there is a general fall until July.

South of the tropics the hottest month is January, except in coastal districts where February is hotter. The coldest month is again July.

The most consistently hot place in the State is Wyndham, where the mean maximum throughout the year is 34.6°C and the mean minimum for the coldest month is 18.9°C. At Marble Bar the yearly mean maximum of 35.4°C is higher, but mean minimum temperatures are consistently lower, falling to 11.4°C in the coldest month. The mean maximum at this centre is the highest in Australia, exceeding 37.8°C in the five months from November to March inclusive. There are often long spells of hot weather in this region and during one period, from 31 October 1923 to 7 April 1924, the maximum temperature at Marble Bar reached or exceeded 37.8°C on 160 consecutive days.

Further south temperatures are lower, but even in the southern parts of the State there are occasional heat waves, and the highest temperature on record, 50.7°C, was recorded at Eucla on the south coast.

Near the coast the sea breeze generally brings relief from high temperatures. It blows nearly every afternoon in the hot months, and is known in Perth as the 'Fremantle Doctor'. Away from the influence of the sea, extremes are greater, day temperatures being higher and night temperatures lower than in the coastal districts. During the winter, temperatures have fallen below — 1.1°C in most of the inland part of the State south from the tropics. The lowest on record is — 6.6°C which occurred at Booylgoo near Sandstone on 15 July 1943, and as far north as Mundiwindi, almost in the tropics, — 5.3°C has been recorded.

Frosts are at times widespread over the southern part of the State and occasionally extend into the tropics, but they are not particularly troublesome as they normally occur during that period of the year when crops are least susceptible to frost damage. They occur mainly in the months May to September inclusive and are most frequent in July and August.

The table below shows, for each month of the year, the mean maximum, mean minimum, and extreme temperatures and the average number of days with registrations of 30.0°C and over and of 40.0°C and over. The average number of days with temperatures of 2.0°C or below, which provides an indication of frost frequency, is also shown.

TEMPERATURES AT REPRESENTATIVE CLIMATOLOGICAL STATIONS

(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
COASTAL													
<i>Wyndham — (New site) (a)</i>													
Temperature:													
Mean max., °C	36.2	35.7	35.8	35.4	32.9	30.3	30.2	32.2	34.9	36.9	37.7	37.1	34.6
Mean min., °C	26.6	26.3	26.3	25.2	22.3	19.8	18.9	20.6	23.6	26.4	27.3	27.2	24.2
Highest max., °C	45.3	43.9	42.2	41.7	39.4	37.8	35.7	38.9	41.1	43.9	45.3	45.0	45.3
Lowest min., °C	18.7	16.7	18.3	17.2	11.1	10.0	8.9	8.3	15.6	18.3	14.4	18.3	8.3
No. of days 30.0°C and over	28.5	27.2	30.4	29.7	27.4	23.1	22.8	28.7	29.9	31.0	30.0	30.6	338.7
No. of days 40.0°C and over	5.2	3.6	4.2	0.5	0.0	0.0	0.0	0.0	0.3	6.5	11.7	10.9	40.5
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Broome —</i>													
Temperature:													
Mean max., °C	33.3	32.9	33.9	34.4	31.3	29.2	28.5	30.0	31.8	32.9	33.6	33.9	32.1
Mean min., °C	26.2	26.0	25.5	22.8	18.5	15.5	13.6	14.8	18.3	22.1	25.0	26.6	21.2
Highest max., °C	44.2	42.7	42.2	41.7	38.3	36.2	35.0	38.1	39.7	42.8	44.3	44.8	44.8
Lowest min., °C	17.8	15.0	12.8	10.7	7.3	5.2	3.3	4.8	8.9	11.6	14.7	17.4	3.3
No. of days 30.0°C and over	29.6	26.8	30.1	29.1	22.0	10.9	9.5	16.5	20.7	24.4	27.9	30.6	278.8
No. of days 40.0°C and over	0.4	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	1.3	1.2	0.6	4.4
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Port Hedland —</i>													
Temperature:													
Mean max., °C	36.2	35.9	36.9	35.2	29.9	27.2	26.4	28.8	32.3	34.2	36.2	36.5	33.0
Mean min., °C	25.1	25.1	24.1	20.9	17.0	13.8	11.7	12.4	15.1	17.1	20.9	23.6	18.9
Highest max., °C	47.5	47.1	44.5	42.3	37.2	34.4	33.8	36.8	40.8	43.7	47.4	47.9	47.9
Lowest min., °C	19.4	11.7	15.8	12.2	7.0	4.7	3.2	3.7	8.4	11.1	12.4	16.6	3.2
No. of days 30.0°C and over	30.4	27.7	30.3	28.4	16.7	5.0	2.8	9.6	22.2	26.5	28.2	30.7	258.9
No. of days 40.0°C and over	5.0	4.5	4.8	0.9	0.0	0.0	0.0	0.0	*	1.9	5.4	6.2	28.6
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(a) Commencing with Year Book No. 21 — 1983 figures relate to reporting station on a new site.

TEMPERATURES AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
COASTAL — <i>continued</i>													
<i>Roebourne —</i>													
Temperature:													
Mean max., °C	38.3	37.7	37.2	34.8	30.0	26.6	26.2	28.5	32.2	34.9	37.8	38.8	33.6
Mean min., °C	26.1	26.0	25.1	21.8	18.1	14.9	13.2	14.2	16.5	19.2	22.6	24.6	20.2
Highest max., °C	47.8	47.6	45.2	43.4	37.8	34.3	33.3	36.1	41.6	45.0	47.4	47.6	47.8
Lowest min., °C	18.6	12.8	17.2	14.1	8.2	4.4	4.4	1.8	7.8	11.1	9.4	11.7	1.8
No. of days 30.0°C and over	30.3	27.4	30.3	28.9	18.6	4.8	3.2	10.3	24.4	28.3	29.5	30.8	268.5
No. of days 40.0°C and over	12.3	8.8	8.1	1.4	0.0	0.0	0.0	0.0	*	3.5	10.2	12.8	56.8
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0
<i>Onslow —</i>													
Temperature:													
Mean max., °C	35.9	35.8	35.4	33.3	28.7	25.3	24.7	26.4	29.2	31.7	34.1	35.4	31.3
Mean min., °C	23.3	23.8	22.8	19.7	15.6	12.6	11.0	11.8	13.7	16.1	18.9	21.2	17.6
Highest max., °C	47.7	48.3	46.4	43.8	38.3	32.2	32.3	35.3	38.3	44.6	46.1	47.5	48.3
Lowest min., °C	15.8	16.6	14.7	10.0	5.6	2.9	3.1	4.4	5.5	7.4	10.0	9.4	2.9
No. of days 30.0°C and over	30.0	27.4	28.2	26.6	10.6	0.8	0.3	3.2	13.1	22.6	25.6	29.0	217.8
No. of days 40.0°C and over	6.1	5.3	4.1	0.5	0.0	0.0	0.0	0.0	0.0	0.8	2.9	5.5	25.1
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Carnarvon —</i>													
Temperature:													
Mean max., °C	30.8	32.0	30.1	28.1	25.9	23.1	21.9	22.4	23.8	25.6	27.0	28.9	26.7
Mean min., °C	22.6	23.1	21.9	18.7	14.9	13.0	11.0	11.3	13.8	16.4	18.7	20.8	17.2
Highest max., °C	47.7	46.6	45.3	41.1	36.2	31.8	30.3	31.2	38.4	42.4	43.4	45.4	47.7
Lowest min., °C	16.8	17.2	13.4	9.5	6.1	3.6	3.4	3.5	7.8	8.8	10.7	12.6	3.4
No. of days 30.0°C and over	15.1	16.9	14.9	8.4	2.8	0.1	0.0	0.3	1.8	3.7	4.5	8.4	76.6
No. of days 40.0°C and over	1.8	2.3	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.8	6.0
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Geraldton —</i>													
Temperature:													
Mean max., °C	31.6	32.2	30.6	26.7	24.0	20.6	19.4	19.8	21.6	24.5	27.1	29.9	25.7
Mean min., °C	18.7	19.1	17.5	14.9	12.6	11.2	9.2	8.7	8.8	10.9	13.7	16.7	13.5
Highest max., °C	47.7	44.8	44.3	39.4	36.6	28.5	28.8	31.6	35.5	40.7	42.2	46.7	47.7
Lowest min., °C	10.2	10.0	8.9	6.9	2.1	0.5	1.1	1.3	1.8	3.1	3.8	7.7	0.5
No. of days 30.0°C and over	15.1	16.6	14.6	6.7	1.1	0.0	0.0	0.1	0.7	3.0	7.0	11.2	75.8
No. of days 40.0°C and over	3.3	2.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.3	8.3
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	*	0.0	0.0	0.0	0.4
<i>Perth —</i>													
Temperature:													
Mean max., °C	29.6	29.9	27.8	24.5	20.7	18.2	17.3	17.9	19.4	21.2	24.6	27.3	23.2
Mean min., °C	17.7	17.9	16.6	14.1	11.6	9.9	9.0	9.1	10.1	11.5	14.0	16.2	13.1
Highest max., °C	44.7	44.6	41.3	37.6	32.4	28.1	26.3	27.8	32.7	37.3	40.3	42.3	44.7
Lowest min., °C	9.2	8.7	7.7	4.1	1.3	1.6	1.2	1.9	2.6	4.2	5.6	8.6	1.2
No. of days 30.0°C and over	14.8	14.6	9.9	2.6	0.1	0.0	0.0	0.0	0.1	1.3	4.2	8.9	55.0
No. of days 40.0°C and over	1.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.8
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	*	0.1	*	0.0	0.0	0.0	0.0	0.0	0.1
<i>Bunbury —</i>													
Temperature:													
Mean max., °C	27.5	27.6	25.8	22.9	19.8	17.6	16.8	17.1	18.2	19.9	23.0	25.6	21.8
Mean min., °C	14.8	15.1	14.1	12.0	10.2	9.1	8.2	8.3	9.2	10.1	12.1	13.7	11.4
Highest max., °C	41.2	40.1	38.3	33.9	28.7	25.1	22.3	24.2	28.8	33.6	37.7	38.6	41.2
Lowest min., °C	5.6	5.2	4.1	2.6	0.1	0.6	—2.2	0.6	—1.1	0.6	4.0	3.6	—2.2
No. of days 30.0°C and over	9.0	9.3	4.2	0.4	0.0	0.0	0.0	0.0	0.0	0.2	1.2	4.8	29.7
No. of days 40.0°C and over	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.3
<i>Albany —</i>													
Temperature:													
Mean max., °C	25.8	25.4	24.2	21.0	18.5	16.3	15.7	15.5	16.7	18.8	21.1	23.9	20.2
Mean min., °C	13.3	13.9	12.9	11.6	9.5	8.1	7.4	6.8	7.4	9.0	10.4	12.4	10.2
Highest max., °C	45.6	41.6	40.5	38.8	32.6	23.6	22.5	22.0	26.8	31.7	41.1	41.1	45.6
Lowest min., °C	5.6	5.1	5.0	5.2	2.9	0.0	1.1	1.4	1.4	2.3	2.9	3.7	0.0
No. of days 30.0°C and over	4.2	4.4	4.0	0.8	0.1	0.0	0.0	0.0	0.0	0.1	1.1	2.7	15.9
No. of days 40.0°C and over	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.4	0.3	0.0	0.0	0.0	1.2
<i>Esperance — Post Office —</i>													
Temperature:													
Mean max., °C	25.9	25.2	24.8	22.9	20.1	18.5	17.0	17.2	18.8	20.7	22.5	23.5	21.4
Mean min., °C	15.9	16.4	14.9	13.1	10.1	9.1	7.9	7.2	8.7	10.6	12.6	14.4	11.7
Highest max., °C	47.2	44.3	43.6	38.9	33.1	27.2	26.0	31.5	35.6	39.9	42.2	44.4	47.2
Lowest min., °C	4.9	4.9	3.9	3.3	1.7	0.0	—0.6	0.0	1.3	1.0	3.3	4.4	—0.6
No. of days 30.0°C and over	5.7	4.3	4.7	2.7	0.5	0.0	0.0	0.0	0.4	2.4	3.0	3.0	27.6
No. of days 40.0°C and over	1.5	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	2.9
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.0	0.0	0.0	0.0	0.6

TEMPERATURES AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
COASTAL — <i>continued</i>													
<i>Eucla —</i>													
Temperature:													
Mean max., °C	24.9	24.6	24.7	22.9	20.9	18.7	17.8	18.8	20.6	21.8	22.7	23.8	21.8
Mean min., °C	16.5	16.7	16.1	13.4	10.2	8.2	6.9	7.5	8.9	10.9	13.2	15.1	11.9
Highest max., °C	50.7	48.9	44.4	41.4	35.8	33.3	32.1	34.9	40.0	43.1	46.7	49.3	50.7
Lowest min., °C	7.2	6.6	4.6	-0.2	0.6	-2.2	-2.2	-1.6	-0.6	-0.3	2.8	3.3	-2.2
No. of days 30.0°C and over	6.0	4.7	5.2	4.2	0.7	0.2	0.0	0.3	2.4	5.7	5.7	6.1	42.6
No. of days 40.0°C and over	2.1	1.1	0.8	0.7	0.0	0.0	0.0	0.0	0.1	0.4	0.5	1.2	6.1
No. of days 2.0°C and under	0.0	0.0	0.0	0.1	0.0	0.3	0.5	0.6	0.2	0.0	0.0	0.0	1.5
WHEAT BELT													
<i>Carnamah —</i>													
Temperature:													
Mean max., °C	36.0	35.3	32.7	27.4	22.6	19.1	17.7	19.3	22.2	25.6	29.8	33.1	26.7
Mean min., °C	18.2	18.5	16.6	13.3	10.3	8.6	7.0	6.9	7.8	9.8	12.7	15.4	12.1
Highest max., °C	48.1	45.6	43.9	40.0	34.4	27.8	27.8	29.4	35.1	40.0	43.1	44.1	48.1
Lowest min., °C	5.1	6.9	6.7	1.7	1.1	0.0	0.6	0.7	1.0	1.1	2.3	6.7	0.0
No. of days 30.0°C and over	27.7	24.8	21.2	8.5	0.7	0.0	0.0	0.0	0.5	6.3	14.9	25.9	132.0
No. of days 40.0°C and over	4.7	6.8	1.9	*	0.0	0.0	0.0	0.0	0.0	0.0	0.6	3.7	17.9
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.3	0.0	0.0	0.0	0.9
<i>Wongan Hills —</i>													
Temperature:													
Mean max., °C	34.0	33.9	30.1	25.3	21.3	17.6	16.9	17.2	19.9	24.9	29.1	32.5	25.2
Mean min., °C	17.6	17.6	15.4	12.4	9.1	7.7	6.2	5.8	6.7	9.9	12.9	15.6	11.4
Highest max., °C	47.4	44.4	42.5	39.2	34.7	26.0	25.4	27.2	35.2	38.8	41.8	44.2	47.4
Lowest min., °C	8.8	9.5	5.6	2.8	-0.6	0.5	-0.9	-0.5	0.6	1.7	4.3	5.3	-0.9
No. of days 30.0°C and over	25.1	22.1	16.3	6.3	0.5	0.0	0.0	0.0	0.3	4.8	11.1	21.7	107.6
No. of days 40.0°C and over	3.5	3.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	9.5
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.5	0.7	1.2	3.1	0.5	0.2	0.0	0.0	6.4
<i>Kellerberrin —</i>													
Temperature:													
Mean max., °C	33.9	33.2	30.2	25.5	20.5	17.3	16.2	17.6	20.8	24.4	28.9	31.9	25.1
Mean min., °C	16.8	16.7	15.1	11.7	8.4	7.0	5.7	5.6	6.6	8.8	12.3	14.9	10.8
Highest max., °C	46.1	46.7	44.4	39.2	35.6	26.9	24.4	28.3	36.5	39.4	43.1	45.0	46.7
Lowest min., °C	7.2	6.1	4.8	1.1	-2.2	-3.1	-3.3	-2.4	-1.1	0.3	1.7	5.6	-3.3
No. of days 30.0°C and over	24.9	20.8	15.3	4.7	0.3	0.0	0.0	0.0	0.4	4.9	11.5	20.3	102.5
No. of days 40.0°C and over	3.5	1.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	7.3
No. of days 2.0°C and under	0.0	0.0	0.0	*	1.0	1.8	3.1	4.6	2.1	0.1	*	0.0	12.9
<i>Southern Cross —</i>													
Temperature:													
Mean max., °C	34.7	33.8	30.7	25.7	20.6	17.1	16.3	18.2	22.1	25.6	30.1	33.2	25.7
Mean min., °C	17.1	16.9	14.9	11.1	7.4	5.6	4.2	4.6	6.3	9.0	12.7	15.3	10.4
Highest max., °C	46.1	47.2	44.4	39.6	33.3	27.5	26.7	30.6	34.8	39.3	43.4	45.9	47.2
Lowest min., °C	5.6	5.6	3.4	-1.1	-3.3	-4.3	-5.0	-3.9	-3.3	-0.8	2.0	4.9	-5.0
No. of days 30.0°C and over	26.6	22.7	17.2	6.0	0.5	0.0	0.0	0.1	0.6	6.6	13.6	23.8	117.8
No. of days 40.0°C and over	5.0	2.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.9	10.8
No. of days 2.0°C and under	0.0	0.0	0.0	0.2	1.9	4.1	7.7	8.0	3.5	0.9	*	0.0	26.3
<i>Merredin —</i>													
Temperature:													
Mean max., °C	33.6	32.9	29.8	25.0	19.7	16.7	15.6	17.0	20.6	24.1	28.6	31.7	24.6
Mean min., °C	16.8	16.7	15.1	11.6	7.9	6.3	4.7	4.6	5.8	8.4	12.2	14.9	10.4
Highest max., °C	46.0	44.5	39.6	36.2	33.4	24.6	25.1	26.9	34.4	38.4	41.6	42.8	46.0
Lowest min., °C	10.6	8.9	5.4	2.5	-1.4	-2.1	-1.7	-2.8	-1.8	-0.3	0.6	3.3	-2.8
No. of days 30.0°C and over	24.4	21.0	15.5	4.5	0.2	0.0	0.0	0.0	0.4	3.6	10.8	20.7	99.9
No. of days 40.0°C and over	2.5	2.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.3	7.0
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	1.1	2.4	4.4	6.9	3.8	0.5	0.1	0.0	19.8
<i>Northam —</i>													
Temperature:													
Mean max., °C	33.9	33.5	30.6	26.1	20.7	17.6	16.6	17.8	20.5	23.5	28.4	31.9	25.1
Mean min., °C	17.0	16.9	15.3	11.8	8.4	6.4	5.4	5.7	7.1	8.9	12.4	15.3	10.9
Highest max., °C	46.2	46.7	43.9	39.4	35.1	27.2	25.0	28.0	34.6	39.4	44.1	45.6	46.7
Lowest min., °C	7.3	7.5	5.5	0.6	-2.7	-3.9	-2.1	-1.1	-0.9	0.4	2.1	5.6	-3.9
No. of days 30.0°C and over	25.1	22.1	16.3	5.6	0.4	0.0	0.0	0.0	0.2	4.0	10.1	21.8	106.6
No. of days 40.0°C and over	3.7	3.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.2	10.5
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	1.2	2.8	3.4	4.3	1.9	0.2	0.0	0.0	13.5
<i>Wandering —</i>													
Temperature:													
Mean max., °C	31.6	30.9	28.2	23.6	18.8	15.8	14.9	15.9	18.1	21.0	25.8	29.4	22.8
Mean min., °C	13.6	13.4	11.8	8.7	6.2	4.9	3.9	4.0	4.9	6.1	8.9	11.8	8.2
Highest max., °C	45.6	44.6	41.9	37.2	33.2	25.0	23.8	26.1	30.9	36.9	39.8	42.8	45.6
Lowest min., °C	3.3	2.8	-0.6	-2.2	-5.6	-5.7	-4.4	-3.9	-2.8	-2.2	-1.7	1.0	-5.7
No. of days 30.0°C and over	20.5	16.9	11.3	2.7	*	0.0	0.0	0.0	*	1.6	6.9	16.3	76.2
No. of days 40.0°C and over	1.5	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	3.3
No. of days 2.0°C and under	0.0	0.0	*	1.2	5.8	6.7	8.9	10.7	9.2	4.8	1.1	*	48.2

TEMPERATURES AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
WHEAT BELT — <i>continued</i>													
<i>Narrogin —</i>													
Temperature:													
Mean max., °C	30.9	30.0	26.7	22.2	18.1	15.0	14.5	14.6	16.7	20.9	25.1	29.2	22.0
Mean min., °C	14.7	14.5	12.8	10.4	7.4	6.8	5.3	5.0	5.8	8.0	10.4	12.5	9.5
Highest max., °C	43.4	42.3	38.2	36.1	32.2	22.7	22.2	23.9	28.6	33.7	42.1	40.1	43.4
Lowest min., °C	8.4	6.1	3.6	0.8	-1.1	-2.7	-0.9	-0.9	-0.5	1.1	3.0	3.2	-2.7
No. of days 30.0°C and over	16.5	13.8	7.5	1.6	0.1	0.0	0.0	0.0	0.1	0.8	4.9	13.6	56.6
No. of days 40.0°C and over	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	1.8
No. of days 2.0°C and under	0.0	0.0	0.0	0.2	1.2	2.4	3.8	4.6	3.2	0.3	0.0	0.0	17.0
<i>Katanning —</i>													
Temperature:													
Mean max., °C	30.3	29.4	26.7	22.7	18.2	15.4	14.3	15.4	17.7	20.6	25.2	28.4	22.1
Mean min., °C	13.4	13.5	12.4	10.2	7.8	6.6	5.3	5.5	6.3	7.6	9.9	12.1	9.2
Highest max., °C	43.8	44.6	41.7	36.1	32.3	24.1	22.2	31.1	30.6	37.8	41.1	43.3	44.6
Lowest min., °C	5.0	3.3	1.7	0.6	-1.1	-2.1	-3.9	-2.2	-1.2	-0.6	1.7	2.7	-3.9
No. of days 30.0°C and over	16.7	13.3	8.4	1.3	*	0.0	0.0	0.0	0.0	1.2	5.0	12.5	58.1
No. of days 40.0°C and over	1.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	2.0
No. of days 2.0°C and under	0.0	0.0	0.0	*	1.3	2.5	2.7	3.5	2.2	0.5	0.0	0.0	12.8
OTHER INLAND													
<i>Halls Creek —</i>													
Temperature:													
Mean max., °C	37.0	36.3	35.7	34.2	29.7	27.4	26.9	29.8	34.0	37.4	38.5	38.3	33.8
Mean min., °C	24.3	23.8	22.9	20.4	17.0	13.8	12.3	14.5	18.5	22.7	24.3	24.6	19.9
Highest max., °C	44.0	42.6	42.1	39.4	36.7	33.8	33.6	36.6	38.8	43.8	44.8	44.9	44.9
Lowest min., °C	17.7	17.7	15.6	11.2	7.1	3.0	1.7	4.9	8.3	12.8	13.9	15.6	1.7
No. of days 30.0°C and over	29.7	27.0	29.8	27.9	16.6	6.3	6.3	16.1	27.4	30.5	29.7	30.5	279.2
No. of days 40.0°C and over	5.6	3.5	1.6	0.0	0.0	0.0	0.0	0.0	0.0	2.6	8.3	8.7	30.7
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
<i>Marble Bar —</i>													
Temperature:													
Mean max., °C	41.2	40.3	39.3	36.1	30.8	27.1	26.7	29.6	34.1	37.4	40.7	41.8	35.4
Mean min., °C	26.1	25.6	24.6	21.1	16.3	12.7	11.4	13.0	16.5	20.0	23.6	25.3	19.7
Highest max., °C	49.2	48.3	46.7	45.0	39.4	35.6	35.0	37.2	42.6	45.6	47.2	48.3	49.2
Lowest min., °C	18.9	13.9	15.3	11.1	5.6	1.1	2.2	3.9	5.6	10.0	14.4	17.2	1.1
No. of days 30.0°C and over	30.7	27.7	30.7	28.7	19.4	6.3	5.1	12.5	26.2	30.2	29.8	30.7	279.8
No. of days 40.0°C and over	20.0	15.4	12.9	2.6	0.0	0.0	0.0	0.0	0.2	8.3	16.6	24.0	100.0
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	*
<i>Mundivindi —</i>													
Temperature:													
Mean max., °C	38.3	36.6	35.6	31.2	25.3	22.3	21.2	23.4	28.0	32.8	35.7	37.8	30.7
Mean min., °C	23.8	22.8	21.0	16.2	10.8	8.0	5.7	7.4	11.1	15.7	19.4	22.3	15.4
Highest max., °C	44.6	44.4	42.3	40.6	36.4	31.7	30.6	37.2	39.5	41.4	43.3	45.5	44.6
Lowest min., °C	13.9	12.8	9.4	3.9	-1.7	-4.4	-5.3	-3.6	-1.7	3.3	7.8	10.9	-5.3
No. of days 30.0°C and over	30.4	26.6	29.4	20.5	3.9	0.2	0.0	1.1	10.4	23.2	28.0	30.1	201.4
No. of days 40.0°C and over	10.9	5.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.9	8.0	27.2
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.6	3.0	6.3	3.1	0.1	0.0	0.0	0.0	13.2
<i>Warburton Range —</i>													
Temperature:													
Mean max., °C	38.6	37.2	35.4	29.9	25.0	21.3	21.3	22.5	28.0	32.6	34.8	36.6	30.3
Mean min., °C	22.7	22.5	20.5	14.5	11.5	7.4	6.4	7.2	11.1	16.1	19.2	21.0	15.0
Highest max., °C	46.6	46.9	43.4	40.4	33.9	32.3	31.7	34.3	39.9	42.7	44.4	46.3	46.9
Lowest min., °C	10.0	9.1	9.6	1.8	-1.1	-2.6	-4.1	-2.2	1.1	4.1	7.2	9.4	-4.1
No. of days 30.0°C and over	30.0	26.6	27.4	16.5	4.1	0.0	0.0	2.2	12.0	23.1	25.5	29.3	197.8
No. of days 40.0°C and over	14.6	10.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.4	4.6	32.2
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.6	1.7	5.9	1.5	0.4	0.0	0.0	0.0	8.7
<i>Meekatharra —</i>													
Temperature:													
Mean max., °C	37.8	35.9	34.3	28.9	23.6	19.6	18.6	20.7	24.9	29.6	33.5	36.3	28.6
Mean min., °C	24.2	23.1	21.3	16.8	11.9	9.2	7.3	8.1	11.1	15.1	18.9	22.2	15.8
Highest max., °C	44.3	43.8	43.6	38.8	34.3	28.3	27.9	32.6	35.9	39.4	42.3	45.0	45.0
Lowest min., °C	12.2	12.3	10.3	5.8	1.7	-3.1	-0.2	0.1	-0.6	5.2	7.2	11.1	-3.1
No. of days 30.0°C and over	29.9	26.3	26.8	13.3	1.5	0.0	0.0	0.2	3.8	13.5	22.7	29.0	169.4
No. of days 40.0°C and over	9.9	5.5	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	4.1	22.5
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.1	0.4	1.0	0.4	*	0.0	0.0	0.0	1.8
<i>Laverton —</i>													
Temperature:													
Mean max., °C	36.3	34.3	32.0	27.8	22.6	19.1	17.7	19.9	24.2	28.7	32.3	34.2	27.4
Mean min., °C	21.0	19.9	18.1	14.7	9.9	7.7	5.4	6.2	9.4	13.7	16.8	19.1	13.5
Highest max., °C	46.1	46.1	44.4	40.0	35.0	30.2	30.1	33.9	36.8	40.6	43.9	45.6	46.1
Lowest min., °C	7.2	7.5	6.1	2.8	-0.9	-2.8	-4.2	-2.8	-1.1	2.2	4.4	10.0	-4.2
No. of days 30.0°C and over	27.7	22.7	20.4	11.6	1.7	0.1	0.0	0.4	3.5	13.2	21.0	25.3	146.7
No. of days 40.0°C and over	7.5	3.6	1.9	0.1	0.0	0.0	0.0	0.0	0.0	0.1	2.1	3.1	18.3
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.7	1.5	5.5	3.7	0.2	0.0	0.0	0.0	11.6

TEMPERATURES AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
OTHER INLAND — <i>continued</i>													
<i>Kalgoorlie —</i>													
Temperature:													
Mean max., °C	33.6	32.0	29.5	25.2	21.0	17.8	16.5	18.2	21.7	26.1	29.4	32.0	25.3
Mean min., °C	18.3	17.7	15.8	12.3	8.3	6.7	4.8	5.1	7.3	11.0	14.0	16.5	11.5
Highest max., °C	46.4	43.3	44.5	38.9	32.9	27.6	28.1	29.7	35.1	40.7	41.7	45.0	46.4
Lowest min., °C	9.8	8.6	6.1	1.7	—1.8	—2.6	—3.4	—2.4	—0.6	—1.0	3.7	5.5	—3.4
No. of days 30.0°C and over	23.6	18.1	13.8	5.0	0.4	0.0	0.0	0.0	1.4	6.1	11.9	20.6	99.6
No. of days 40.0°C and over	3.2	2.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	*	0.4	1.7	7.8
No. of days 2.0°C and under	0.0	0.0	0.0	*	1.1	3.9	6.8	5.7	1.1	0.1	0.0	0.0	18.9
<i>Rawlinna —</i>													
Temperature:													
Mean max., °C	32.9	31.7	29.6	25.5	21.7	18.6	17.9	19.8	23.4	26.3	29.6	31.7	25.7
Mean min., °C	15.3	15.1	14.3	11.3	8.1	5.9	4.4	5.1	7.4	9.8	12.2	14.2	10.3
Highest max., °C	47.9	46.4	44.7	40.0	35.0	31.3	29.7	33.9	39.3	41.7	45.6	45.7	47.9
Lowest min., °C	5.6	5.0	6.1	1.7	0.0	—2.7	—2.3	—3.2	—0.6	0.7	0.8	5.1	—3.2
No. of days 30.0°C and over	22.9	17.0	14.4	7.0	1.2	*	0.0	0.5	3.0	9.0	13.7	19.4	105.8
No. of days 40.0°C and over	4.8	2.7	1.5	*	0.0	0.0	0.0	0.0	0.0	0.3	1.1	2.9	12.7
No. of days 2.0°C and under	0.0	0.0	0.0	*	0.5	2.6	6.2	4.3	1.2	0.0	*	0.0	15.2
<i>Collie —</i>													
Temperature:													
Mean max., °C	31.1	30.6	27.7	22.4	19.1	16.5	15.6	16.3	18.0	21.3	24.8	28.9	22.7
Mean min., °C	14.2	14.1	12.3	9.5	7.1	6.2	4.7	4.7	6.1	7.8	10.2	12.6	9.1
Highest max., °C	44.4	43.4	40.8	36.7	30.4	24.4	22.8	26.1	30.3	36.3	38.8	41.7	44.4
Lowest min., °C	3.2	1.8	0.2	—1.3	—2.2	—4.0	—3.9	—3.2	—2.2	—0.6	0.3	1.7	—4.0
No. of days 30.0°C and over	18.6	14.8	9.5	1.6	*	0.0	0.0	0.0	0.0	1.3	5.3	12.9	63.3
No. of days 40.0°C and over	1.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.8
No. of days 2.0°C and under	0.0	0.0	*	0.8	2.7	5.3	6.3	7.6	4.1	1.1	0.2	0.0	28.3
<i>Manjimup —</i>													
Temperature:													
Mean max., °C	26.6	26.5	24.3	20.6	17.1	15.1	14.0	14.8	16.4	18.3	21.5	24.3	19.9
Mean min., °C	12.6	12.7	12.0	10.1	8.3	7.1	5.8	6.0	6.8	7.8	9.6	11.2	9.2
Highest max., °C	41.7	41.2	38.9	33.6	29.2	22.9	21.7	24.7	28.1	33.3	37.4	38.8	41.7
Lowest min., °C	5.6	4.4	3.3	1.6	1.1	0.2	—2.8	—1.1	—0.6	0.1	1.7	4.4	—2.8
No. of days 30.0°C and over	10.3	10.0	4.8	0.4	0.0	0.0	0.0	0.0	0.0	0.2	1.4	6.6	33.2
No. of days 40.0°C and over	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
No. of days 2.0°C and under	0.0	0.0	0.0	0.1	0.1	0.7	0.4	0.8	0.3	0.1	0.0	0.0	2.4
<i>Pemberton —</i>													
Temperature:													
Mean max., °C	25.9	25.8	23.9	20.4	17.6	15.6	14.6	15.3	16.4	18.3	21.1	23.4	19.8
Mean min., °C	12.9	13.2	12.6	10.6	8.9	8.2	6.9	6.6	7.2	8.1	9.8	11.6	9.7
Highest max., °C	41.7	40.1	38.9	33.9	28.3	23.2	22.0	25.6	28.3	41.2	36.9	38.5	41.7
Lowest min., °C	4.4	4.4	3.9	2.8	0.0	—0.4	—1.4	—1.1	—0.3	0.6	2.5	3.9	—1.4
No. of days 30.0°C and over	8.1	7.9	4.1	0.6	0.0	0.0	0.0	0.0	0.0	0.9	1.2	4.6	29.1
No. of days 40.0°C and over	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.5	0.5	0.2	0.0	0.0	1.7
<i>Mount Barker —</i>													
Temperature:													
Mean max., °C	27.4	26.3	24.7	21.0	18.1	15.5	14.8	15.0	16.5	19.2	21.8	24.9	20.4
Mean min., °C	13.3	13.6	12.7	10.8	8.7	7.5	6.5	6.0	6.7	8.3	10.0	12.0	9.7
Highest max., °C	43.9	43.6	40.6	37.2	32.2	24.3	22.2	25.0	29.3	35.6	39.4	42.9	43.9
Lowest min., °C	1.7	3.9	3.6	2.2	0.6	0.0	—0.4	—1.3	—0.6	0.6	1.1	1.1	—1.3
No. of days 30.0°C and over	9.6	7.5	5.2	0.8	0.1	0.0	0.0	0.0	0.0	0.5	2.3	6.1	31.8
No. of days 40.0°C and over	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
No. of days 2.0°C and under	0.0	0.0	0.0	0.0	0.1	0.3	0.7	0.7	0.4	0.0	0.0	0.0	2.2

* Number of occurrences is greater than 0.0 but less than 0.05.

THUNDERSTORMS

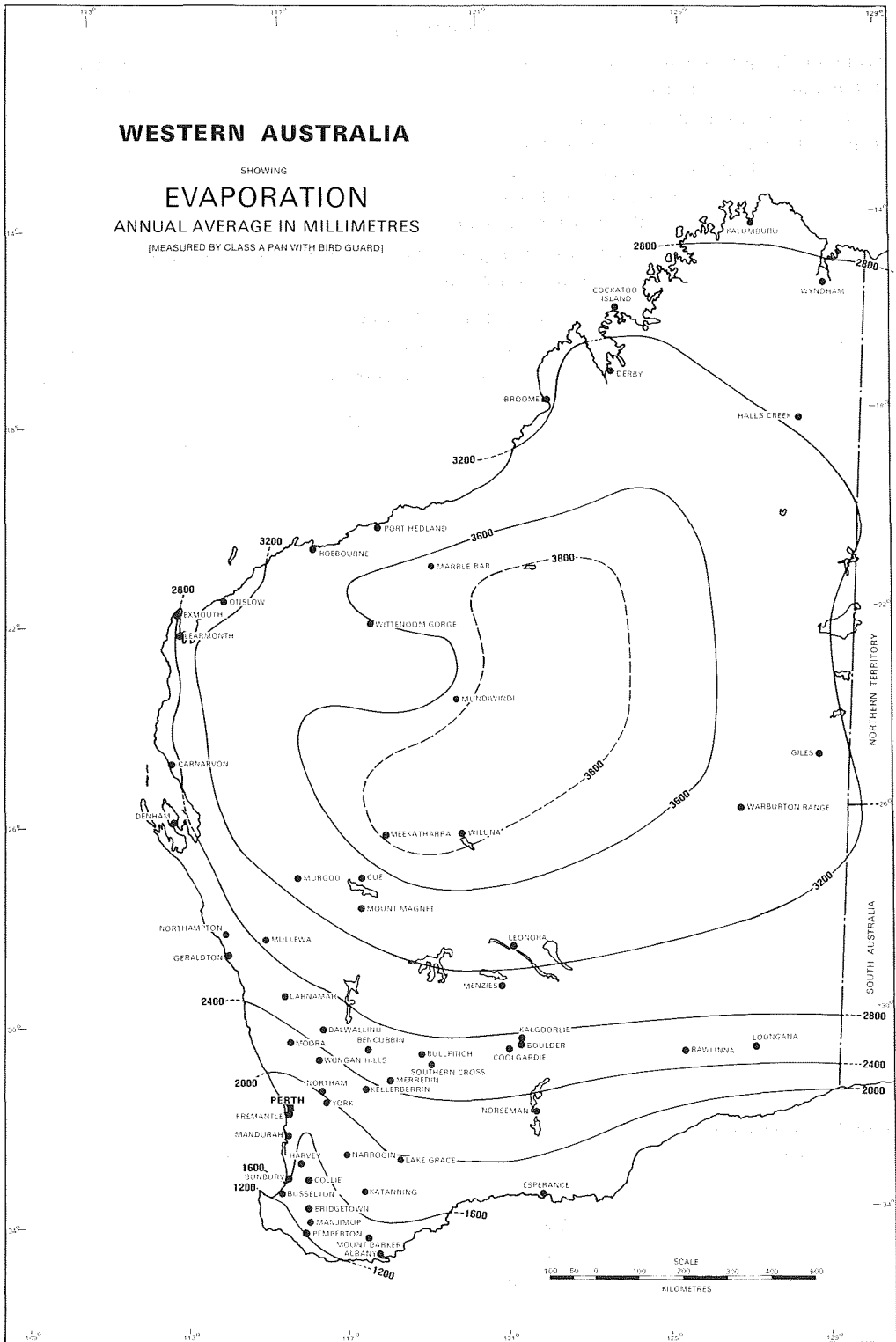
Thunderstorms are most frequent along the Kimberley coast where they occur during the 'Wet' season but are practically unknown in the 'Dry'. In the remainder of the tropics they occur over roughly the same period but the season is a little shorter and the storms less frequent.

In most of the State south from the tropics thunderstorms are most frequent in the summer months but in the south-west they are more uniformly distributed and in many places in coastal districts they are most frequent in winter.

The winter storms are often accompanied by hail which, however, is usually not heavy enough to cause any damage. Hail accompanying summer storms can be much heavier, and occasionally damages ripening crops in the wheat belt. Both winter and summer thunderstorms may be accompanied by severe squalls, but these are infrequent.

WESTERN AUSTRALIA

SHOWING
EVAPORATION
 ANNUAL AVERAGE IN MILLIMETRES
 [MEASURED BY CLASS A PAN WITH BIRD GUARD]



EVAPORATION

Except in the lower south-west, evaporation from a free water surface exceeds the annual rainfall, and in a large proportion of the State it is more than ten times greater than the rainfall.

It is least in the winter months, amounting in July to less than fifty millimetres in the far south-west, and to about 225 millimetres in the northern tropics. In January, when evaporation is highest, it totals about 200 millimetres on the far south coast and reaches 500 millimetres in the East Gascoyne and North-Eastern Meteorological Districts. Further north, evaporation is reduced by the moister air over the tropics at this time of the year.

The average annual evaporation throughout the State, using the Class A pan evaporimeter with bird guard, is shown on the preceding map.

METROPOLITAN CLIMATE

Perth has more sunshine and a greater number of clear days during the year than any other State capital city. It also has the wettest winter, the driest summer, and is the windiest of the capital cities. The highest temperature on record for Perth is 44.7°C (12 January 1978) and the lowest 1.2°C (7 July 1916).

CLIMATOLOGICAL DATA — PERTH BUREAU OF METEOROLOGY

(For other data relating to Temperature and Rainfall see preceding tables.)

Month	Wind				Temperature				Relative humidity (Saturation = 100%)	Sun- shine — Mean daily amount	Cloud (proportion of sky covered) — Mean of readings at 9 a.m., 3 p.m., and 9 p.m.		
	Prevailing direction	Speed			Highest in sun	Lowest terrestrial	Mean	At 3 p.m.			Evapor- ation — Mean daily amount		
	9 a.m.	3 p.m.	Average	Highest									
Number of years of observations	30 (a)	30 (a)	60	63	78	30 (a)	30 (a)	30 (a)	13 (b)				
			km/h	km/h	°C	date	°C	date	%	hours	%	mm	
January	E	SSW	17.5	81	80.7	22/1914	4.2	20/1925	53	43	10.4	29	9.3
February	ENE	SSW	17.2	113	78.7	4/1934	4.3	1/1913	52	43	9.8	31	8.9
March	E	SSW	16.2	113	75.0	19/1918	2.6	(c)	57	46	8.8	35	7.1
April	ENE	SSW	13.7	130	69.4	8/1916	-0.7	26/1960	60	48	7.5	42	4.4
May	NE	WSW	13.5	119	63.3	4/1925	-3.9	31/1964	68	58	5.7	54	3.0
June	N	NW	13.5	129	57.5	9/1914	-3.4	27/1946	72	63	4.8	59	2.3
July	NNE	W	14.2	137	56.2	13/1915	-3.8	30/1920	73	63	5.4	56	2.4
August	N	WNW	15.1	156	62.8	29/1921	-3.0	18/1966	71	60	6.0	56	2.8
September	ENE	SSW	15.1	109	67.5	29/1916	-2.7	(d)	64	57	7.2	49	4.0
October	SE	SW	16.1	105	71.8	19/1954	-1.2	16/1931	64	54	8.1	48	5.7
November	E	SW	17.2	101	75.0	30/1925	-1.1	1/1968	57	47	9.6	39	7.1
December	E	SSW	17.7	103	76.0	11/1927	3.3	29/1957	54	46	10.4	32	8.7
Year —													
Average	E	SSW	15.6	..	..	..	..	..	62	52	7.8	44	..
Extremes	..	..	..	156	80.7	22/1/14	-3.9	31/5/64	..	..	..	..	..

(a) Standard 30 year's normal (1911-1940). (b) Class A Pan 1967-1979. Correction of +7% applied for bird screen. (c) Recorded on 8 March 1903 and 16 March 1967. (d) Recorded on 8 September 1952 and 6 September 1956.

SNOW

Snow has been known to fall as far north as Wongan Hills, but it is only in the southern districts that it occasionally lies on the ground. It is seen on top of the Stirling Range for a short time nearly every winter, but elsewhere is very infrequent and of negligible importance.

INTERSTATE COMPARISONS

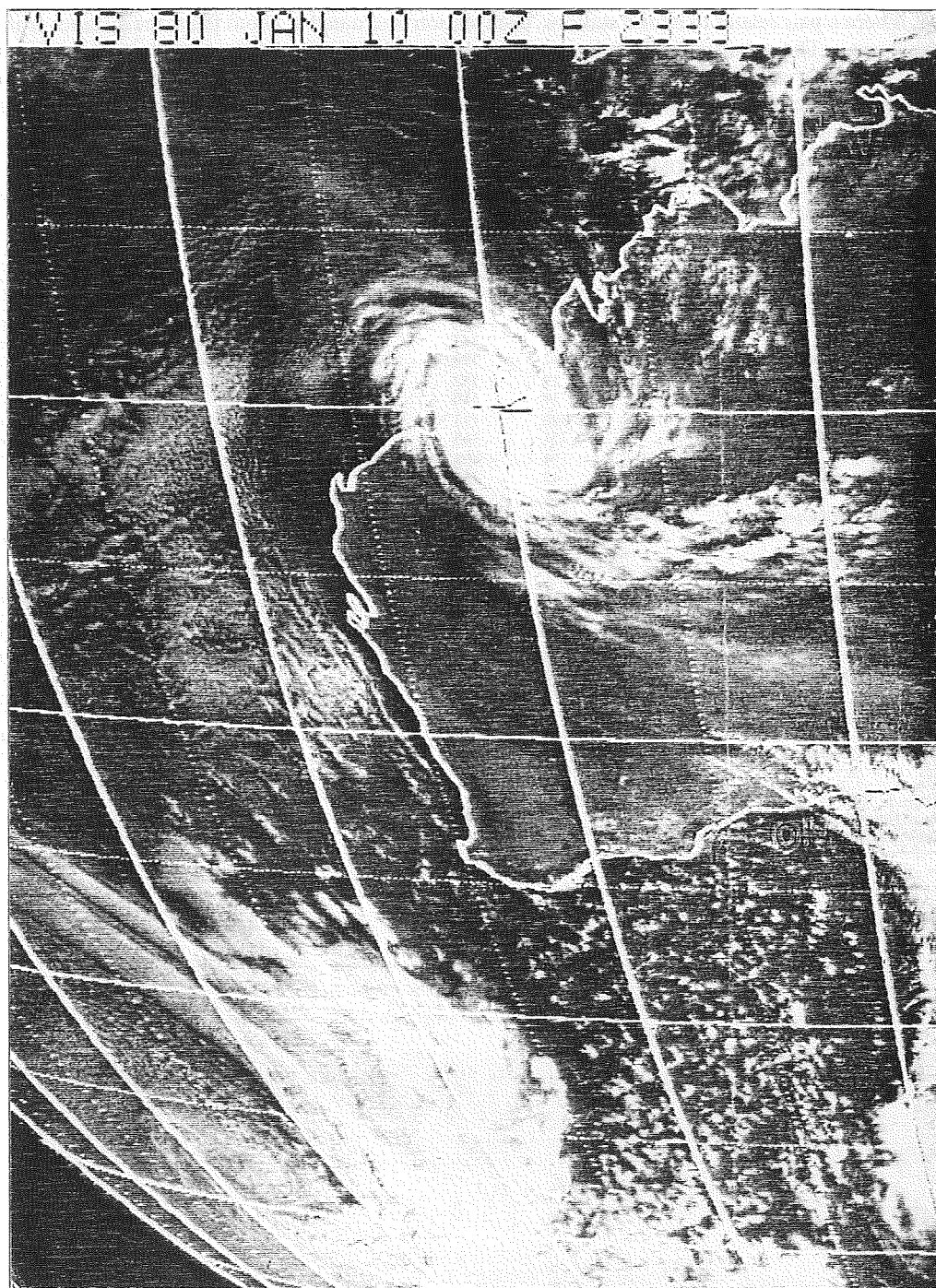
In general, humidity and rainfall are lower in Western Australia than in corresponding places in eastern Australia. The following table shows average rainfall, mean humidity and temperature for groups of reporting stations at approximately the same latitude. The stations have been selected in such a way that, in each pair, one is on the west coast and the other on the east coast

or, where a pair relates to inland stations, each station is situated at about the same distance from the coast. The group appearing last in the table has been included to provide a comparison between observations at Albany, the most southerly town in Western Australia, and those at places elsewhere in Australia at about the same latitude. The height above mean sea-level is also given for each station.

INTERSTATE COMPARISONS — RAINFALL, HUMIDITY, TEMPERATURE

Reporting station	Height above mean sea- level	Average rainfall		Relative humidity (a) (9 a.m.)		Average daily mean temperature	
		May to October	November to April	May to October	November to April	May to October	November to April
	metres	mm	mm	%	%	°C	°C
Bunbury	5	753	129	75	66	13.7	19.6
Sydney, New South Wales	42	590	626	67	65	14.9	21.0
Perth	19	753	120	73	56	14.7	21.7
Newcastle, New South Wales	34	560	585	72	75	14.7	20.7
Kalgoorlie	380	135	128	64	49	13.8	23.1
Cobar, New South Wales	251	165	191	62	42	14.0	24.6
Geraldton	4	408	74	69	50	16.0	23.3
Brisbane, Queensland	42	366	780	64	65	17.7	23.7
Wiluna	518	83	160	49	32	15.9	27.1
Charleville, Queensland	294	158	357	56	46	15.5	25.7
Carnarvon	5	171	77	62	59	18.6	24.6
Bundaberg, Queensland	14	318	841	66	69	18.5	24.5
Mundjwindi	561	69	193	38	29	18.5	28.4
Longreach, Queensland	187	117	374	49	44	19.1	27.9
Onslow	4	117	148	53	46	20.6	28.3
Mackay, Queensland	11	262	1,378	72	75	19.5	25.3
Port Hedland	8	66	238	38	45	22.2	29.8
Townsville, Queensland	22	107	1,097	62	67	21.5	26.6
Derby	16	44	525	38	59	26.4	31.2
Innisfail, Queensland	7	912	2,732	82	81	21.2	25.7
Wyndham	7	40	708	34	52	27.5	31.4
Cooktown, Queensland	5	223	1,561	73	76	23.9	27.2
Albany	13	591	218	81	67	12.5	18.0
Adelaide, South Australia	43	365	168	68	50	13.4	20.5
Swan Hill, Victoria	70	201	144	77	51	11.8	20.6
Canberra, Australian Capital Territory	560	293	340	78	63	8.1	17.3

(a) Saturation = 100%.



Visual photograph taken by the Geostationary Meteorological Satellite showing the cloud mass associated with Cyclone 'Amy' as it crosses the north-west coast of Western Australia at 8 a.m. on 10 January 1980.

TROPICAL CYCLONES

The fully developed tropical cyclone is one of the most devastating of natural phenomena. In areas such as the Bay of Bengal, the Philippines, the Carribean and Gulf of Mexico the deaths and destruction that can occur are well appreciated. Although the strength and duration of the winds associated with these storms usually trigger a fearful response in people, it is perhaps surprising to know that most of the world-wide deaths have been the result of inundation of low lying coastal areas by cyclone produced storm surges.

Tropical cyclones are known by a variety of regional names, for example, in the Carribean and Gulf of Mexico they are called 'hurricanes', a derivative of a word meaning 'big wind', while in the western North Pacific the term 'typhoon' is used.

Our knowledge of the structure and dynamics of tropical cyclones has been greatly improved in the last twenty years by the use of aircraft (in other parts of the world) to penetrate and observe these storms. Radar has also been employed extensively to monitor the movement and structure of cyclones as they approach populated areas. In Western Australia weather watch radars are currently installed at Broome, Port Hedland, Learmonth and Perth.

In Australia, photographs taken by orbiting and geostationary satellites at visible and infra-red wavelengths have provided the primary data in recent years for monitoring the life cycle of tropical cyclones. This applies particularly over the oceans where few observations are available. The satellite visual photograph on the previous page shows Cyclone 'Amy' as it crosses the north-west coast of Western Australia on 10 January 1980. Facilities to receive this type of data have been established in Perth, Darwin and Brisbane. In 1977 the first Japanese Geostationary Meteorological Satellite (GMS 1) was launched. This provided three-hourly photographs of the areas of concern to Australia. In 1981 GMS 2 was launched and has taken over provision of this service. By using satellite photographs taken at visible and infra-red wavelengths it is possible to analyse the intensity of a tropical cyclone to produce estimates of its lowest central pressure and maximum wind speed.

Area of Formation. Cyclones form over some of the tropical oceans, mainly within narrow bands between latitudes 5° and 20°. Those affecting Western Australia often form in the Arafura and Timor Seas but may even develop as far west as the Cocos-Keeling Islands. Occasionally a system which has developed as far east as the Coral Sea will cross the north of the continent and descend with renewed vigour on Western Australia. A large number of cyclones also form further westward in the Indian Ocean, but these seldom affect Western Australia.

Time of Occurrence. In the Southern Hemisphere, cyclones develop mainly in the months of January, February and March, and to a lesser degree in November, December and April. Only rarely do they occur outside these months near the continent and no authenticated storms have been recorded in June, August or October. They do occur, however, over the ocean areas to the west of the continent and, if these are included, only the month of June has been cyclone-free.

Conditions Favouring Development. It is generally accepted that there are six primary conditions for the development of a tropical cyclone:

1. A pre-existing low level disturbance usually detectable on satellite photographs as a convective cloud cluster of at least 200 kilometres diameter at a latitude at least 4° from the equator.
2. Low level cyclonic relative vorticity 200 to 600 kilometres from the disturbance centre.
3. A large area of sea surface with temperatures greater than 26°C and with this temperature maintained to a depth of approximately sixty metres.
4. A conditionally unstable atmosphere — i.e. an atmosphere in which forced vertical motion of saturated air will result in deep convection.

5. High moisture content in middle levels of the troposphere.
6. Small net tropospheric ventilation which implies small vertical wind shear between the lower and upper troposphere (500 — 12,000 metres). This inhibits ventilation of the middle and upper troposphere in the vicinity of a cloud cluster and allows the accumulation of sensible heat.

Lifetime. This is determined by the time of year, place of origin, distribution of water temperatures and the general circulation features existing in the atmosphere at the time of the occurrence. Cyclones developing in the Gulf of Carpentaria, for example, tend to have short life spans because the region of formation is so close to land; conversely cyclones developing well out to sea have the longest life spans. Very few tropical cyclones dissipate over warm tropical or sub-tropical waters unless some adverse broad scale atmospheric flow pattern occurs. In the Australian region the life spans of tropical cyclones range from less than one day to more than twenty days. The average is about nine days.

Life Cycle. Tropical cyclones have a distinct life cycle, which may be divided into four stages:

The formative stage

In satellite pictures the disturbance appears as an unusually active, but poorly organised, area of convection that has usually become detached from the broad scale band of enhanced convection associated with the tropical convergence zone. The circulation centre is usually ill-defined but sometimes curved cumulus cloud bands indicate a centre near the edge of the main convective cloud mass. Surface pressures are generally higher than 1,000 millibars and there may not even be a closed surface isobar which would indicate an identifiable low pressure system. The strongest surface winds are well removed from the centre, tend to occur in disorganised squalls and are often confined to one quadrant. Apart from local squalls the maximum wind is usually less than gale force. When formative stage tropical cyclones move inland, they produce little or no damage on landfall but are often associated with heavy rain and sometimes subsequently grow into significant rain depressions, causing widespread flooding over northern Australia.

The immature stage

In this stage the disturbance acquires a warm core as air sinks into the centre of the circulation. Intensification occurs simultaneously. The minimum surface pressure rapidly drops below 1,000 millibars and convection becomes organised into long bands spiralling inwards. The circulation centre is well defined and an eye may form. Gale force winds develop over a comparatively small area in sympathy with the strengthening pressure gradient, and the maximum winds (which now may be hurricane force or more) are concentrated in a tight band close to the centre. In satellite pictures several well organised curved bands of active convection may be seen spiralling in towards a central dense mass of clouds covering the focal point of the banding, or surrounding the eye. The eye (if it exists) may be masked by a canopy of cirrus cloud, which itself may contain curved striations associated with the outflow at the top of the tropical cyclone.

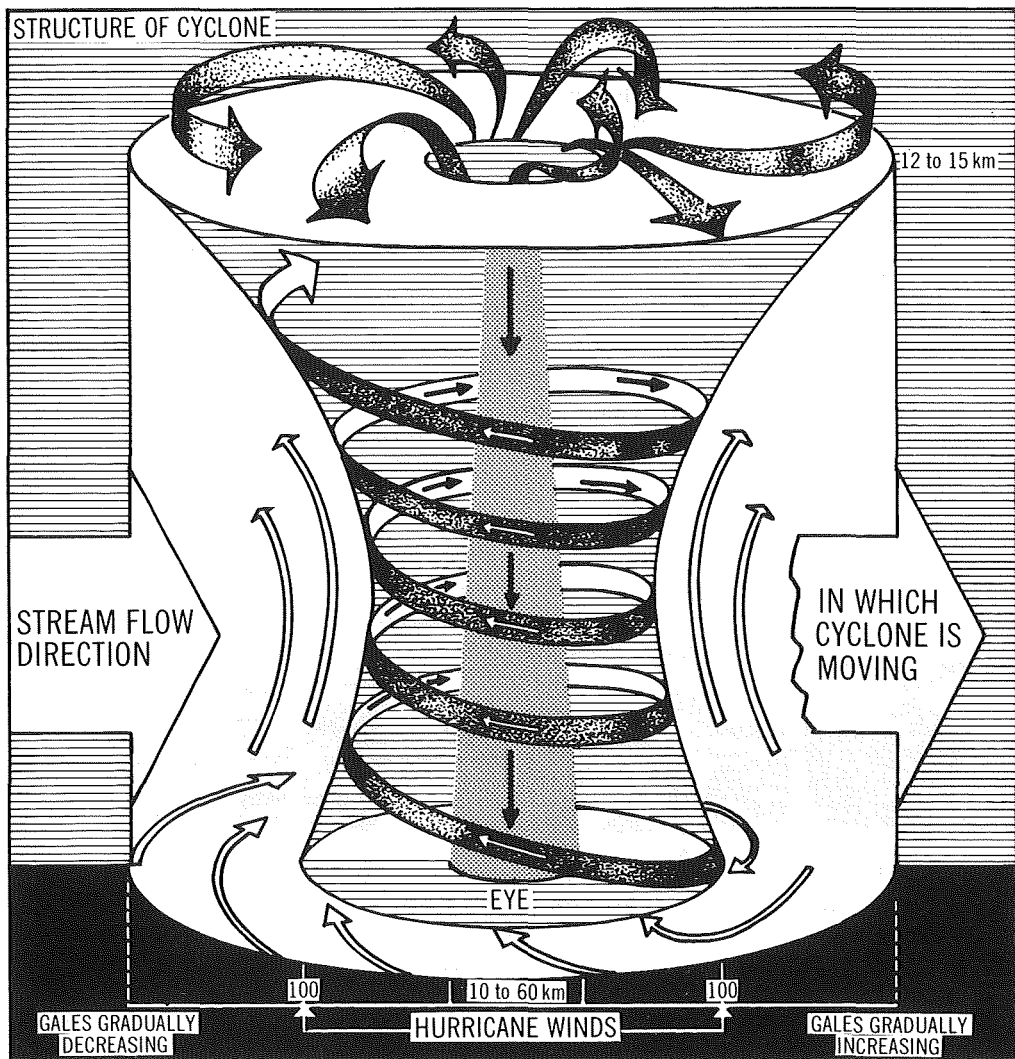
The immature tropical cyclone can cause devastating wind and storm surge effects upon landfall, although damage is usually confined to a relatively small area. In this stage of development very rapid intensification can occur and the associated structural changes observed when the cyclone is under radar surveillance can sometimes be confusing.

The mature stage

During this stage the tropical cyclone acquires a quasi-steady state with only random fluctuations in central pressure and maximum wind speed. However, the cyclonic circulation and extent of the gales increase markedly and the cyclone may expand to three times its immature diameter. Asymmetries in the wind field may also become more pronounced. In satellite pictures the cloud field is highly organised and symmetrical and the more intense cyclones are characterised by a round central dense overcast containing a

well-centred, distinct round eye. The surrounding convective bands are tightly coiled and quasi-circular as can be seen in the satellite photograph at the beginning of this article.

Mature stage tropical cyclones usually produce more widespread damage upon landfall than those in the immature stage. However, there is a large variation in the size of mature stage cyclones and some are smaller and/or less intense upon landfall than some immature stage systems. Studies suggest that only a small part (usually less than 24-hours) of a tropical cyclone's lifetime is spent in the mature or maximum intensity stage.



**SCHEMATIC DIAGRAM OF AIR MOTION
IN A TROPICAL CYCLONE**

The decay stage

The warm core is destroyed during this stage, the central pressure rises, and the belt of maximum wind expands away from near the centre. Decay may occur very rapidly if the system moves into an unfavourable atmospheric or geographic environment, but sometimes only the tropical characteristics are modified while the cyclonic circulation moves on to higher latitudes.

In satellite pictures the decaying stage is characterised by the absence of a central dense overcast, a general decrease in the amount of cirrus in the vicinity of the circulation centre, little or no anticyclonic curvature at the cirrus level, and a weakening and disappearance of major curved convective bands. The low-level circulation centre may still be very well defined by narrow bands of low clouds. The main benefit of decaying tropical cyclones is their potential to produce heavy rainfall over the drier parts of the State.

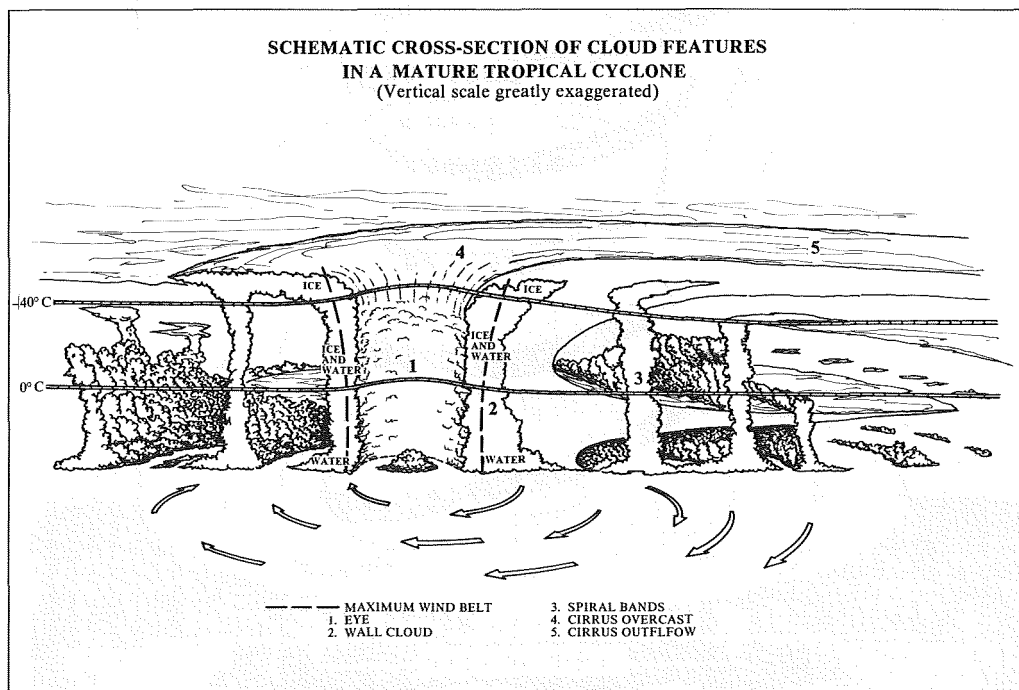
Physical Structure

Eye

The central portion of a cyclone is called the eye and has been remarked on by observers since records were first available. It is the part of the cyclone in which the pressure reaches its lowest value, the wind moderates to calm or relatively light conditions, the rain ceases and the cloud decreases or wholly clears. The width of the eye is variable; it may be very small, perhaps 2 to 4 kilometres in diameter in young or miniature systems, or up to sixty kilometres in large mature ones.

Cloud

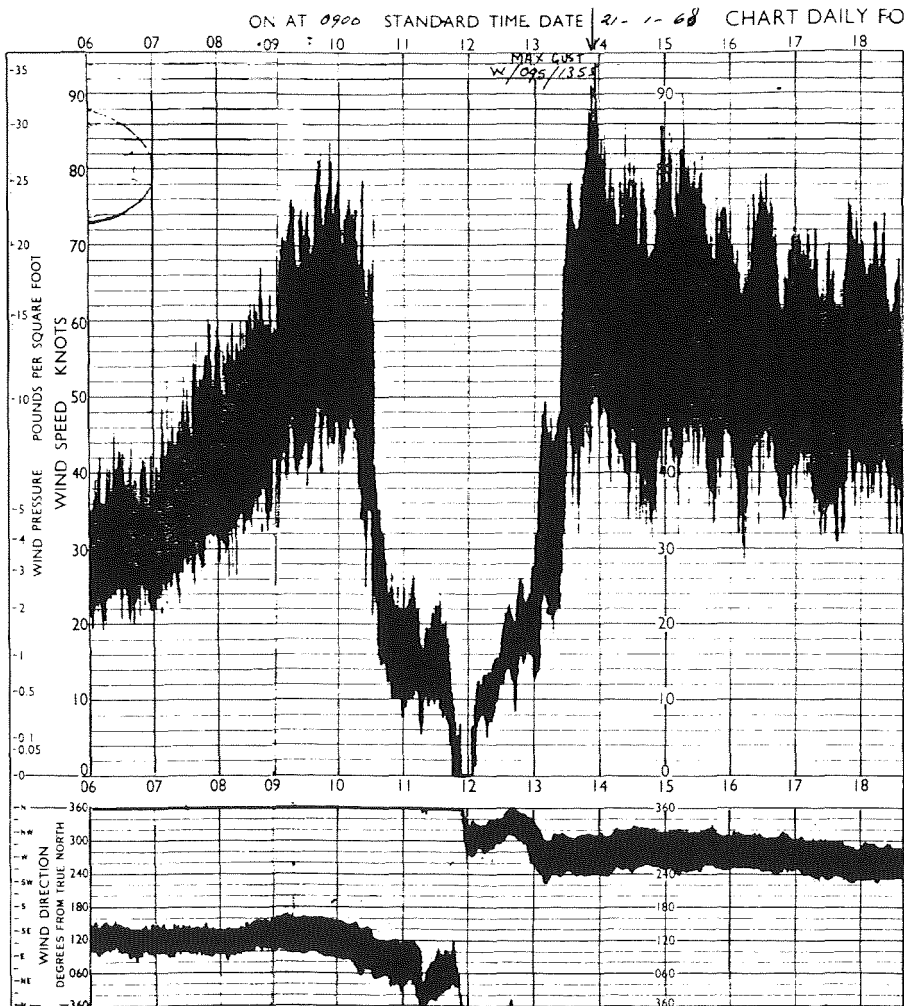
Immediately around the eye is a huge wall of clouds called the eye wall. These clouds are formed as the inward spiralling moist air converges and is forced to ascend giving rise to very rapid vertical motion of the air and the development of a deep cloud structure frequently extending about fifteen kilometres.



Other characteristic features of the cloud structure are the rain bands which spiral inward towards the centre of the storm and converge in the eye wall region. The rain bands also have clouds of great vertical development, and it is here and in the eye wall that the heavier rain squalls are usually encountered. Interspersed between the rain bands are less active clouds of a more stratiform nature. The structure of a cyclone is diagrammatically illustrated in the figures above.

Winds

The area of strongest winds is generally within about 10 to 60 kilometres of the centre and the highest speeds are usually in the front left hand quadrant of the storm — viewed in the direction of motion. Sustained surface winds of 110 to 160 kilometres per hour (with

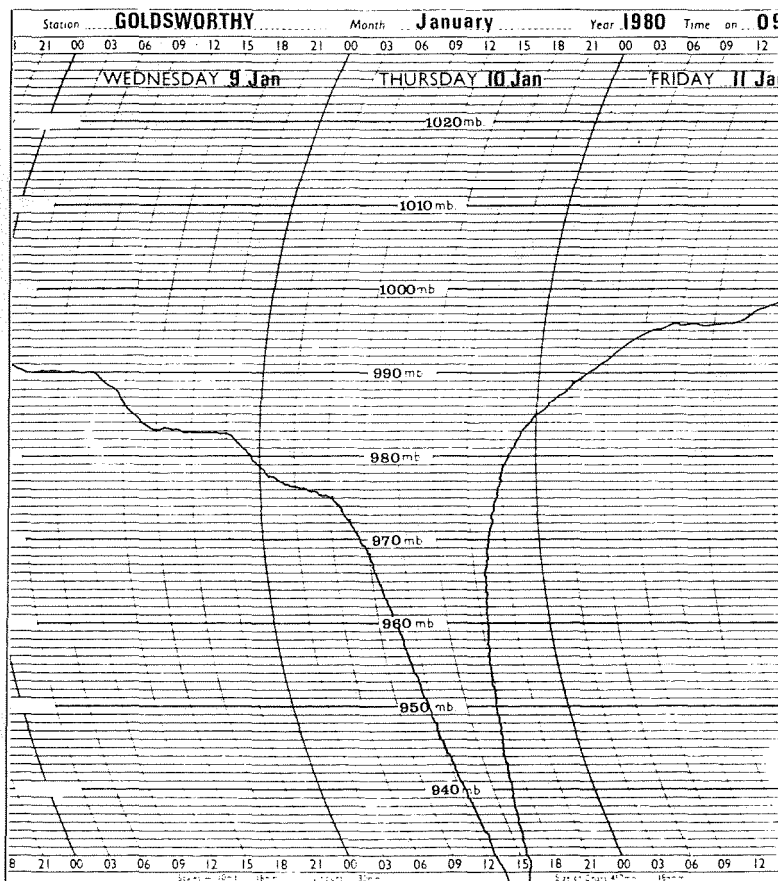


Anemogram from Cocos Island indicating passage of eye of Cyclone 'Doreen' over the station at approximately midday on 21 January 1968.

gusts half as high again) are common within 80 kilometres of the centre. Winds exceeding 63 kilometres per hour (gale force) are often experienced more than 150 kilometres from the centre. The destructiveness of the wind is generally considered to increase with the square of its speed, and a change of wind speed from 80 kilometres per hour to 110 kilometres per hour, for example, almost doubles the pressure it exerts.

Normally the wind speed at a point increases rapidly as the centre approaches. As the eye of the cyclone passes over a place there is a lull, and after a period, which may range from a few minutes to an hour or more, the wind suddenly strikes from the opposite direction with a speed nearly equal to that before the lull. This is clearly indicated in the diagram above.

The strongest gusts measured on the north-west coast are: 232 kilometres per hour at Onslow during a cyclone in February 1963, 246 kilometres per hour also at Onslow during 'Trixie' on 19 February 1975 and 260 kilometres per hour at Mardie on 19 February 1975 during 'Trixie'.



Barogram from Goldsworthy, 10 January 1980 as Tropical Cyclone 'Amy' passed approximately ten kilometres to the west.

Pressure

Tropical cyclones originate in areas of relatively low pressure and as they develop, the air pressure continues to fall. The central pressure in the more intense cyclones would usually be well below 970 millibars. The lowest pressure ever measured in a cyclone is 870 millibars in Typhoon 'Tip' in the North-West Pacific on 11 October 1979.

The pressure field is usually almost symmetrical about the storm centre with the maximum rate of change of pressure with distance outward from the centre occurring near the radius at which the wind speed is a maximum. The minimum pressure lies within the eye, but in individual moving systems the pressure minimum does not necessarily coincide with the geometric centre of the eye or with the circulation centre defined by the wind field.

The most familiar mode of presentation of surface pressure distribution is the barogram and the rapid changes in pressure are strikingly illustrated in Goldsworthy's barogram for tropical cyclone 'Amy', which passed close to the town on 10 January 1980.

Movement. Tropical cyclones move in response to a combination of external forces applied by the surrounding environment and internal forces generated within the tropical cyclone's circulation. Steering of the cyclone by the surrounding environmental winds has been suggested as an important mechanism in determining the movement.

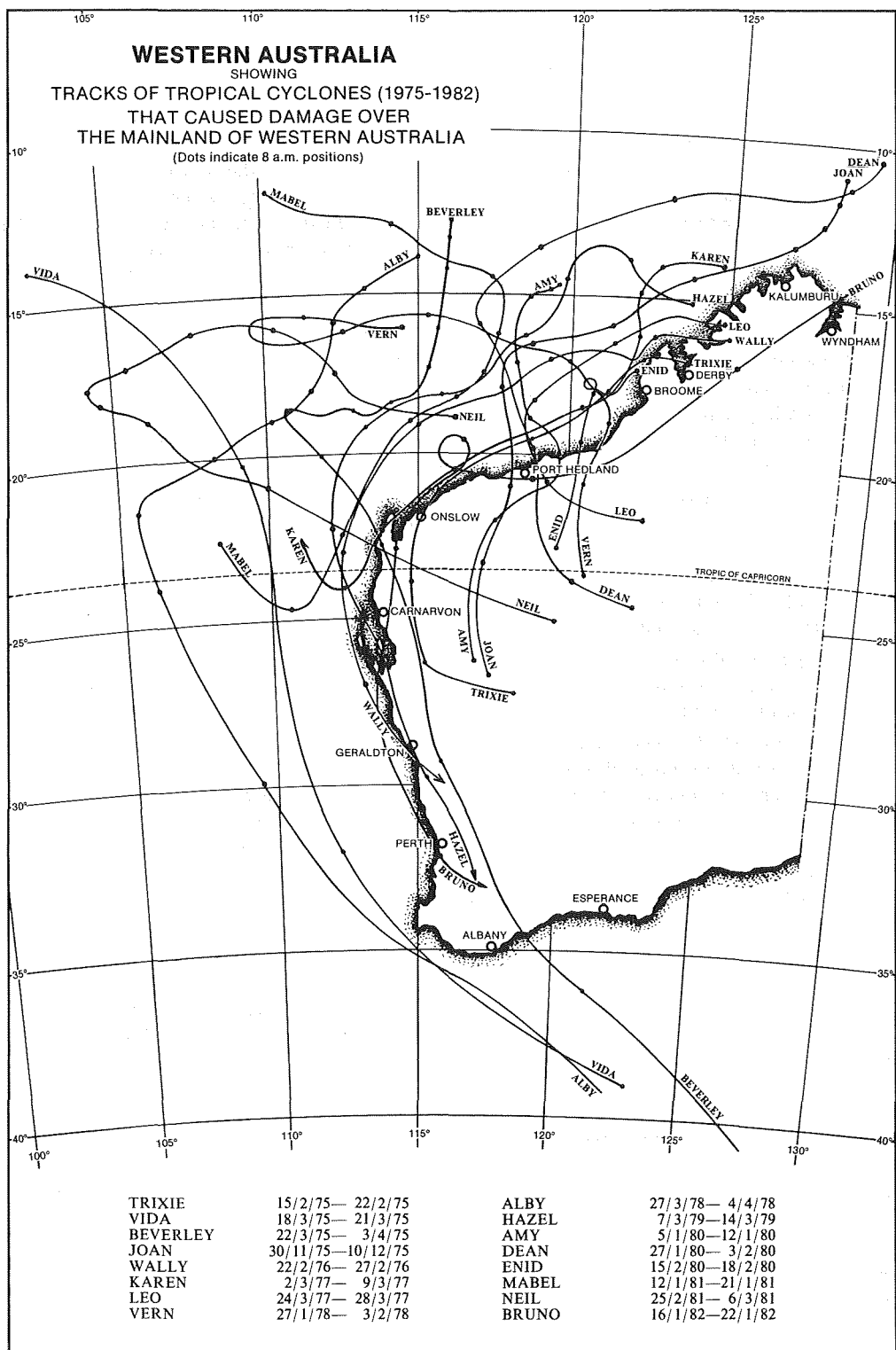
Near north-western Australia cyclones have followed many different paths as shown by the selection of tracks in the figure below. Despite the variability of individual tracks, the most common or climatological path of cyclones in this area runs from the Timor Sea in a west-south-westerly direction parallel to the north-west coast. From the area just to the north of Exmouth Gulf the path splits with some cyclones continuing westward into the Indian Ocean while others change direction to the south.

Cyclones usually move with speeds of less than twenty-five kilometres per hour in the tropics, however, where they accelerate into higher latitudes speeds of 60 to 80 kilometres per hour are not uncommon.

Sea Waves and Swell. The huge waves generated by cyclone wind fields over the open sea constitute a hazard to ships of all sizes. In addition offshore operations (such as oil drilling) can be severely disrupted and considerable damage may result to structures and equipment. There are few accurate recordings of the magnitude of cyclone waves in the Australian region. During a tropical cyclone in the 1972-73 season, a wave recorder off the north-west coast of Western Australia measured a wave of 7 metres at a point some 75 kilometres off the cyclone track, and about 4 hours prior to the time of closest approach of the centre. The theoretical maximum wave height for that cyclone was estimated to be around 18 metres. The highest wave ever recorded accurately anywhere was 34 metres during a prolonged stormy period in the North Pacific in 1933.

Because of the extreme winds in the inner regions of a cyclone very high seas are generated. Near the centre of the cyclone, wave trains moving in different directions meet, giving rise to the development of very confused and dangerous pyramidal seas. Outside the actual area of the storm the wave trains travel away as a swell which gradually decreases in height. Before the introduction of meteorological satellites these swells sometimes provided indications of a cyclone which may have developed undetected. The direction from which the train of waves is moving before it reaches the shallow water near the shore points to the area in which the waves were generated and hence to the location of the cyclone at the time of generation of the waves. Changes in the direction of the swell can give a crude indication of the past movement of the system.

Storm Surges. A storm surge is the name given to an abnormal rise in water level which may accompany the movement of a tropical cyclone near or over a coast. The rise in water level is caused by the combined effects of wind stress on the water surface and the reduction in atmospheric pressure. In deep water this latter effect is the most significant so that the



maximum surge height occurs at the storm centre. As a cyclone approaches a coast the combined effects of the reduction in water depth, the underwater shape of the coastal basin, the reduction in pressure and the frictional stress of the wind on the water surface combine to increase the surge height. The height of the surge is superimposed on the normal tidal level so that if the surge occurs at a time of high tide, extensive flooding of low-lying coastal areas is possible. The large tidal range along the north-west coast has reduced the incidence of storm surge flooding, however, it is a very important consideration when designing shoreline structures and assessing the suitability of coastal land for development.

In 1939 a storm surge caused significant flooding in Port Hedland. Other locations, notably Onslow, Exmouth Gulf, Shark Bay and Bunbury have experienced the effects of storm surges.

Rainfall. The rainfall produced by tropical cyclones is often, but not always, widespread and heavy. Rain gauge measurements are at best only an approximation to the actual amount of rain which has fallen. This is due to the extreme wind which drives the raindrops almost horizontally and to the turbulence around the gauge which prevents the full amount of rain being collected. While rain can occur near the outer edge of a cyclone, the heaviest falls are usually concentrated in the inner part of the cyclone just outside the eye where the vertical motion is largest. It follows that if a system moves slowly over a location, that area will be deluged; on the other hand, if the system moves rapidly, the total rainfall will be reduced.

The heaviest rainfall is usually concentrated in the front of the system. Outside that area the falls decrease and tend to become less widespread. Even in the area of most intensive rainfall there is some variation in amounts from place to place and this becomes more marked away from the centre. Many falls of 250 millimetres or more in 24 hours have been produced in Western Australia by cyclones. The greatest amount measured in one day was 747 millimetres at Whim Creek on 3 April 1898. An amount of 927 millimetres was recorded in 36 hours during the same storm.

Part 3 — The Vegetation of Western Australia ⁽¹⁾

Contributed by T. E. H. Aplin

(Western Australian Herbarium, Department of Agriculture)

The flora of Western Australia consists of about 8,000 species of flowering plants (angiosperms), 15 cycads and conifers (gymnosperms) and 50 ferns. The families of flowering plants which characterise the flora are also widespread throughout Australia, e.g. Myrtaceae, Proteaceae and Leguminosae. The Styliaceae, Goodeniaceae and Epacridaceae, which are poorly represented outside Australia, are well developed in Western Australia. The five families which are endemic in Western Australia are entirely restricted to the South-West Province. These are the Cephalotaceae, Eremosynaceae, Emblingiaceae, Ecdeiocoleaceae and Anarthriaceae. Other large groups of plants (below the level of family) which are almost wholly endemic in this State are the *Chloanthoideae* (Verbenaceae), *Prostantheroideae* (Lamiaceae), *Persoonieae* and *Banksieae* (Proteaceae) and *Epacrideae* (Epacridaceae). The *Chamelaucioideae* (Myrtaceae), although not strictly endemic, has a high percentage of species restricted to Western Australia. At the generic level there are forty-seven monotypic genera, most of which are endemic in the South-West Province, while at the species level 2,472, or 68 per cent of species in the South-West are endemic.

The State of Western Australia occupies about one-third of the continental land-mass of Australia and lies south of the equator between latitudes 13° and 35°. One-third of the State lies within the tropics, while the remainder extends into the temperate zone. Climatically, Western Australia shows a marked variation from a predominantly summer rainfall pattern in the north to a characteristically Mediterranean-type winter rainfall pattern in the south. Between these two rainfall systems is a large region whose climate is characterised by the extreme variability of the rainfall both annually and seasonally.⁽²⁾ The vegetation of Western Australia, in general terms, is determined by these varying climatic patterns, although local changes in geology, soils, topography and drainage may affect the structure and/or the floristic composition of plant communities. The delineation of the present day vegetation also reflects the past tectonic and climatic history of the Australian continent.

The development of the so-called pan-Australian mesophytic flora, which includes the tropical broad-leaved genera *Cinnamomum* and *Tristania*, the more temperate genera *Dacrydium*, *Podocarpus*, *Araucaria*, *Nothofagus* and *Phyllocladus* and the typically Australian genera *Eucalyptus*, *Casuarina*, *Callitris* and *Banksia*, began early in the Tertiary era. It is generally accepted that in the Palaeozoic era the Australian continent was united with the continents of Africa, Antarctica, India and South America in a once common land-mass known as Gondwanaland. During this period these continents had a common flora as exemplified by the *Glossopteris* elements. In the late Neocomian period (Early Cretaceous), rifting between India (with Africa and South America) and Australia (with Antarctica) was initiated. In Eocene times (Early to Mid-Tertiary), sea-floor spreading between Australia and Antarctica commenced and for the first time the southern coasts were warmed by the entering Indian Ocean. The early Tertiary flora of the South-West Province contained several sub-tropical rainforest and mangrove genera in abundance. This phenomenon has prompted the suggestion that some 'tropical' elements may in fact be 'palaeoantarctic' in origin. The Australian continental block

(1) See *Appendix* for reference to additional information in earlier issues of the Year Book.

(2) See Part 2 of Chapter II, — *Climate and Meteorology*.

was isolated at about the time the pan-Australian flora began to develop, and the northward drift of the continent which brought the Australian block into contact with the Asian block in the middle Miocene period (Late Tertiary) allowed the entry of a different flora, the 'Indo-Malayan' flora.

The degree of endemism and diversification in the south-western flora, which had its origin in pre-Miocene times, was brought about largely by the isolation caused by the late Eocene and Miocene seas which inundated the Nullarbor Shelf. Another factor that contributed to the diversification of the flora was the lateritisation that occurred in the Tertiary period, with the subsequent dissection of the lateritic landscape causing fragmentation of a once continuous flora.

Certain floral and morphological characters are considered to be primitive or to have developed at a very early stage in the evolution of plants. Primitive floral characters are seen in 27 relict genera in Western Australia (17 in the South-West Province, 12 in the Eremaean Province and 16 in the Northern Province). They include *Cycas*, *Macrozamia*, *Callitris*, *Casuarina*, *Hibbertia*, *Emblingia*, *Codonocarpus*, *Persoonia*, *Clematis* and *Pandanus*. Relict species which have retained primitive morphological characters number 234 for the State. A large proportion of these are found in the South-West Province. One hundred and nine species are present in the Stirling botanical district. Many endemic genera are represented, e.g. *Isopogon*, *Adenanthos*, *Stirlingia*, *Synaphea* and *Franklandia* (Proteaceae) and *Andersonia*, *Sphenotoma*, *Cosmelia*, *Lysinema*, *Coleanthera* and *Conostephium* (Epacridaceae). *Thysanotus* (Liliaceae) and *Stylidium* (Stylidiaceae) which, although not strictly endemic in, are most richly represented in the State.

There are, in Western Australia, 1,024 species, in 267 genera and 69 families, listed as being rare or threatened. Of these, 853 (83 per cent) are present in the South-West Province. The families with the greatest number (over 50) of endangered species are Proteaceae, Leguminosae, Myrtaceae and Epacridaceae.

Formations and Alliances

The classification of vegetation involves the grouping of similar structural units and the grouping or classification of the floristic components present in all strata of plant communities that form part of the vegetation.

The structural classification of plant communities is based on height/life form of the tallest stratum, and the projective foliage cover of the tallest stratum. Major structural formations recorded in Australia are summarised in the table which follows and further divisions based on height classes and projective foliage cover can be instituted. The nature of the understorey provides logical subdivisions to the formations.

To include floristic detail, the following three categories are often used to define subdivisions within a structural formation.

1. *Alliance* — A series of climax plant communities which have (i) the same structural characteristics, (ii) related species as dominants in the uppermost stratum, and (iii) possibly the same or related species in the understorey.
2. *Association* — A series of climax plant communities which have (i) the same structural characteristics, (ii) the same species as dominants in the uppermost stratum, and (iii) possibly different floristic composition in the understorey.
3. *Society* — A series of climax plant communities which have (i) the same structural characteristics, (ii) the same species as dominants in the uppermost stratum, and (iii) the same species prominent in the lower strata.

High open forest and high woodland are represented by *Eucalyptus diversicolor* (Karri), *E. marginata*-*E. calophylla* (Jarrah-Marri) and *E. gomphocephala* (Tuart) alliances, all in the South-West Province.

Forest formations are represented by *E. marginata*-*E. calophylla* and *Agonis flexuosa* (West Australian Peppermint) alliances in the South-West Province; and by *E. tetradonta*-*E. miniata* (Darwin Stringybark-Darwin Woollybutt), *E. tectifica*-*E. grandifolia* (Darwin Box-Cabbage Gum) alliances in the Northern Province. Woodland and open woodland formations are represented by *E. loxophleba* (York Gum), *E. wandoo* (Wandoo), *E. salmonophloia* (Salmon Gum), *E. occidentalis* (Swamp Yate), *E. astringens* (Brown Mallet), *E. cornuta* (Yate), *E. rudis*-*Melaleuca* spp. (Flooded Gum-Paperbark) and *Casuarina obesa* (Swamp Sheoak) alliances in the South-West Province; by *E. torquata*-*E. lesouefii* (Coral Gum-Goldfields Blackbutt), *E. dundasii* (Dundas Blackbutt) and *E. transcontinentalis*-*E. flocktoniae* (Redwood-Merriit) alliances in the Eremaean; and by *E. camaldulensis* (River Red Gum), *E. tectifica*-*E. grandifolia*, *E. tetradonta*-*E. miniata*, *E. latifolia* (Round-leaf Bloodwood), *E. papuana* (Ghost Gum), *E. polycarpa*-*E. apodophylla* (Small-flowered Bloodwood-Whitebark), *E. microtheca* (Flooded Box) and by *Terminalia* spp., *Melaleuca* spp. and *Adansonia gregorii* (Baobab) alliances in the Northern Province.

Low forest formations are represented by *Melaleuca lanceolata*-*Callitris preissii* (Rottneest Teatree-Rottneest Cypress Pine), *E. platypus*-*E. spathulata*-*E. annulata* (Moort-Swamp Mallet-Open-fruited Mallee), *E. cornuta* (Yate), *E. conferruminata* (Bald Island Marlock), *Agonis juniperina* (Warren River Cedar), *Banksia menziesii*-*B. attenuata*-*Casuarina fraserana*-*E. todtiana* (Menzies Banksia-Slender Banksia-Fraser's Sheoak-Pricklybark), *E. falcata*, and *B. prionotes* (Acorn Banksia) alliances in the South-West Province. Low woodland and low open woodlands are represented by *E. erythrocorys* (Illyarrie), *Casuarina huegeliana* (Rock Sheoak) and *Banksia* spp. alliances in the South-West Province; by *E. brevifolia* (Northern White Gum), *E. pruinosa* (Silver Box), *E. dichromophloia* (Variable-barked Bloodwood), *E. argillacea* (Northern Grey Box), *E. microtheca*, *Grevillea striata* (Beefwood), *Lysiphyllum cunninghamii* (Bauhinia) and *Melaleuca* spp. (Paper Bark) alliances in the Northern Province; and by *E. gongylocarpa* (Desert Gum), *E. kingsmillii* (Kingsmill's Mallee), *E. leucophloia* (Migum), *Casuarina decasneana* (Desert Sheoak), *Acacia aneura* (Mulga) and *A. sowdenii* (Myall) alliances in the Eremaean Province.

Scrub formations are represented in the South-West Province by *Acacia rostellifera*-*A. cyclops*-*A. cochlearis*, *Agonis* spp., *Pultenaea reticulata*, *Melaleuca huegelii*, *M. globifera*, *E. foecunda* (Narrow-leaved Red Mallee), *Acacia* spp.-*Casuarina* spp.-*Melaleuca* spp. (Woodjil-Tamar-Broombush) and mixed Proteaceae-Myrtaceae alliances; and by *Melaleuca thyoides*, *Melaleuca uncinata* and *Acacia aneura* (Mulga) alliances in the Eremaean Province. High shrubland formations include *Actinostrobus arenarius* (Sandplain Cypress Pine), *Banksia ashbyi*-*B. scepterum*, *B. baxteri*, *B. speciosa* (Showy Banksia), *E. redunca*-*E. uncinata* (Black Marlock-Hook-leaf Mallee), *E. tetragona* (Tallerack), *Grevillea eriostachya*-*G. didymobotrya*-*G. leucopterys* and *B. hookerana*-*Xylomelum angustifolium* (Banksia-Sandplain Woody Pear) alliances in the South-West Province; and *Acacia* spp.-*Cassia* spp.-*Eremophila* spp., *E. kingsmillii*, *E. youngiana* (Large-fruited Mallee), *Acacia victoriae*, *A. pyrifolia*, *A. pachycarpa*-*Grevillea wickhamii*, *Acacia lysiphloia*-*Acacia* spp., and *A. aneura* alliances in the Eremaean Province.

Heath and low heath formations are restricted to the South-West Province and are made of mixed communities in which the families Proteaceae, Myrtaceae, Epacridaceae, Xanthorrhoeaceae and Leguminosae are well represented. The genera *Dryandra*, *Banksia*, *Hakea*, *Casuarina*, *Xanthorrhoea* (Blackboy or Grass Tree), *Leptospermum*, *Kuhzea* and *Melaleuca* usually dominate the heath communities. Shrubland and low shrubland formations are dominated by chenopodiaceous shrubs. The most important alliances are *Maireana sedifolia* (Blue Bush), *Atriplex* spp. (Saltbush) and *Halosarcia* spp. (Samphire), which are well represented in the Eremaean Province.

Hummock grasslands are dominated by species of *Triodia* and *Plectrachne*. These genera, commonly called Spinifex, grow outwards leaving the centre senescent or dead. This formation is found in the Eremaean Province. Tussock grasslands are dominated by species of *Astrebula*

(Mitchell Grass), *Dichanthium-Chrysopogon* (Blue Grass-Ribbon Grass), *Iseilema* (Flinders Grass) and by *Themeda* (Kangaroo Grass) alliances with *Sehima* (White Grass), *Heteropogon* (Bunch Speargrass), *Cymbopogon* (Scent Grass), *Sorghum* (Wild Sorghum) and *Aristida* (Three-awn Grass) usually seen only under woodland formations. Fringing grasslands include *Coelorhachis*, *Arundinella* (Reed Grass) and *Imperata* (Blady Grass). These formations are restricted to the Northern Province. Sedgelands are represented in the South-West Province by communities in which the families Juncaceae, Cyperaceae, Restionaceae and Anarthriaceae are prominent.

Other plant communities, recorded in edaphic complexes, include coastal dune vegetation, halophytic communities, swamp communities, lithic complexes and aquatic complexes. Each of these complexes may be unimportant in terms of area, but is of significance in providing the habitat for particularly interesting plants, e.g. *Cephalotus*, *Byblis*, *Drosera*, etc.

PLANT COMMUNITIES — MAJOR STRUCTURAL FORMATIONS

Life-form and height of tallest stratum		Projective foliage cover of tallest stratum, as per cent	Description
Trees over 30 m	....	70-100	High closed forest
		30-70	High open forest
		10-30	High woodland
		under 10	High open woodland
Trees 10-30 m	....	70-100	Closed forest
		30-70	Open forest
		10-30	Woodland
		under 10	Open woodland
Trees under 10 m	....	70-100	Low closed forest
		30-70	Low open forest
		10-30	Low woodland
		under 10	Low open woodland
Shrubs over 2 m	....	70-100	Closed scrub
		30-70	Open scrub
		10-30	High shrubland
		under 10	High open shrubland
Shrubs 1-2 m	....	70-100	Closed heath
		30-70	Open heath
		10-30	Shrubland
		under 10	Open shrubland
Shrubs under 1 m	....	70-100	Low closed heath
		30-70	Low open heath
		10-30	Low shrubland
		under 10	Low open shrubland
Herbs	....	70-100	Closed herbland, closed tussock grassland, closed sedgeland, etc.
		30-70	Herbland, tussock grassland, sedgeland, etc.
		10-30	Open herbland, open tussock grassland, open sedgeland, etc.
Hummock grasses	....	10-30	Hummock grassland
		under 10	Open hummock grassland

Botanical Provinces and Districts

The vegetation of Western Australia has been sub-divided into three Botanical Provinces. The areas that these provinces occupy are determined largely by climatic pattern. Within each province are smaller regions, known as Botanical Districts, in which the

structure and floristics of the vegetation are determined partly by climate and partly by geology and soils. The boundaries of these provinces and districts are shown on the map later in this Part.

The *Northern Province*, or Tropical Zone, is characterised by a dry monsoonal climate. The rainfall received in the summer months ranges from less than 500 mm to over 1,250 mm per annum. The annual mean maximum temperature is over 30°C. The evaporation rate ranges from 2,000-2,500 mm per annum.

The vegetation formations consist of grassy *Eucalyptus* open forests and woodlands. The major components are 'Australian' elements, with 'Indo-Malayan' elements as minor components. The latter are usually found in special habitats such as streamlines or scarps. Some important 'Indo-Malayan' genera are *Ficus* (Moraceae), *Barringtonia* (Lecythidaceae) and *Terminalia* (Combretaceae).

The *Gardner* botanical district, commonly referred to as the Kimberley Plateau, consists of a series of sandstone, shale, quartzite and volcanic rocks. The topography varies from alluvial flats through rolling to hill landscape to very rugged dissected plateau. Saline mud flats are present along estuaries.

On the volcanic rocks and shales, on gently undulating to hilly topography, the woodland and open woodland formations consist mainly of *E. tectifica*-*E. grandifolia* alliance. *E. tectifica* sub-alliance is restricted to the volcanic soils while *E. grandifolia* sub-alliance is developed on the shales and sandstones. *E. latifolia* and *E. papuana* alliances characterise the flats and levee soils. These alliances and sub-alliances include a number of plant associations. Each association is characterised by one or more *Eucalyptus* species. The understorey layers consist of a sparse low tree or high shrubland layer and a dense to moderately dense grassland layer. Small tree genera include *Cochlospermum*, *Terminalia*, *Atalaya* and *Erythrophleum*. Grass genera include *Dichanthium*, *Sehima*, *Chrysopogon*, *Sorghum*, *Heteropogon* and *Themeda*.

On the sandstone and quartzite rocks, ranges and hogbacks, the woodland, open woodland and low open woodland formations are mainly made up of *E. tetradonta*-*E. miniata* alliance. In this alliance, *E. tetradonta* sub-alliance is found mainly in the northern high-rainfall region while *E. phoenicea*-*E. ferruginea* (Scarlet Gum-Rusty Bloodwood) sub-alliance is its southern lower-rainfall counterpart. *Callitris intratropica* (Northern Cypress Pine) forms pure stands on deep red sands. *E. dichromophloia* alliance is found on skeletal sands in rugged sandstone areas. The small tree/shrub layer in the *E. tetradonta*-*E. miniata* alliance includes the genera *Petalostigma*, *Grevillea*, *Gardenia*, *Persoonia*, *Buchanania*, *Ventilago*, *Planchonina*, *Eugenia*, *Brachychiton*, *Terminalia*, *Acacia*, *Jacksonia* and *Melaleuca*. The grass storey is dominated by *Plectrachne pungens*, together with *Sorghum* and *Aristida*. Flats and levees usually carry a *E. polycarpa*-*E. apodophylla* alliance, while the very steep scarps carry a *Brachychiton* spp.-*Terminalia* spp.-*E. confertiflora* variable woodland.

Other alliances and associations found in the Gardner botanical district are *Terminalia* spp.-*Dichanthium* spp. woodland and grassland communities, on soils of heavy texture; *E. brevifolia*, *E. argillacea* and *Melaleuca viridiflora* associations on podsols, over shales and sandstones; fringing communities of *E. camaldulensis* and *Terminalia* spp.-*Ficus* spp.-*Melaleuca* spp.; and mangrove communities on the estuarine mud flats. Closed mixed forests of 'Indo-Malayan' elements such as *Calophyllum*, *Ficus*, *Carallia*, *Barringtonia*, *Nauclea*, *Randia* and *Myristica* and *Melaleuca leucadendron* (Cadjaput) fringe gullies, while semi-deciduous vine thickets with lianes such as *Aristolochia*, *Capparis*, *Cansjera*, *Adenia* and *Canavalia* occur in small pockets.

The alluvial flood plains of the Ord River system carry a tall grass formation including the genera *Dichanthium*, *Asprella*, *Chrysopogon*, *Sorghum* and *Ophiurus*. Frontage woodlands carry a *E. papuana* alliance. *E. tetradonta*-*E. miniata* alliance occurs mainly on lateritic areas

or on acid rocks. *E. tectifera*-*E. grandifolia* alliance occurs more commonly on soils formed on basic rocks, or shales and limestones. In the *Hall* botanical district, the low open woodlands of *E. pruinosa* association are the low-rainfall counterparts of *E. tectifera* woodlands and occur on soils derived from basic rocks. *E. brevifolia* association is generally seen on skeletal soils on acid rocks, and also on many other soils. Low open woodlands of *Terminalia* spp. alliance occur on cracking clay soils formed on volcanics and limestone. Tussock grasslands with *Astrebla*, *Dichanthium*, *Chrysopogon* and *Panicum* occur on high-level plains of Tertiary alluvia. The rugged hilly country of the Halls Creek ridges carries *E. brevifolia* and *E. pruinosa* low open woodland associations over *Triodia intermedia*. The gently undulating plains with calcareous soils carry arid short grass communities of *Enneapogon* (Bottle Washers), *Aristida* and *Sporobolus*. These areas have suffered severe wind and gully erosion and have in recent years been resown to the alien *Cenchrus ciliaris* (Buffel Grass). Low open woodlands of *E. argillacea* are present on red soils on basic rocks (limestone dolomites and volcanics).

The *Fitzgerald* botanical district consists essentially of mountain ranges, plateaus and steep-sided valleys. The ranges and plateaus are made up of quartzite and shale-sandstone with lateritic remnants, lightly covered with a thin soil mantle. The vegetation comprises mainly low open woodland of *E. brevifolia*, *E. dichromophloia* and *E. phoenicea*-*E. ferruginea* communities, with a patchy shrub layer and *Plectrachne pungens* as the main ground component.

The land systems eroded below the quartzite and sandstone surfaces comprise basalt hills with narrow valleys. The vegetation consists of *E. tectifera* woodlands with *Sehima nervosum-sorghum* sp. ground storey on the hills and *Chrysopogon* spp.-*Dichanthium fecundum* grassy understorey on the drainage floors and small areas of cracking clay plains.

The *Dampier* botanical district is a region in which a great thickness of gently folded sedimentary rock, of Palaeozoic and Mesozoic age, overlies a Precambrian basement of crystalline rock. The basement outcrops along the north and east of the basin.

The up-land regions consist of low hills and stony plains with granite domes, gneiss hills, schist ridges and gently sloping sandy plateaus. The vegetation formations consist of low open woodland formations of *Eucalyptus* species with a hummock grassland ground layer. The main alliance of *E. brevifolia* is represented by a number of associations. One noteworthy association is *Grevillea pyramidalis*. The hummock grassland layer consists of the genera *Triodia* and *Plectrachne* in almost pure stands of species. A short grass ground storey with *Enneapogon* and *Aristida* may be seen on the interfluvies and hill-foot slopes to the south-east. The drainage floors usually carry low open woodland formations of *E. dichromophloia* and *E. tectifera* alliances. The grass layer includes the genera *Chrysopogon*, *Sehima*, *Sorghum* and *Dichanthium*.

Rocky limestone areas and shallow calcareous soils are characterised by *Triodia wiseana* hummock grassland. *Adansonia gregorii* open woodland association is largely restricted to rugged limestone country, although *A. gregorii* may be found associated with other species, e.g. with *E. dichromophloia* and *E. perfoliata* (Twinleaf Bloodwood) on granite tors or domes to the north. *E. dichromophloia*, *Grevillea striata* and *Lysiphyllum cunninghamii* low open woodland alliances occur on the outcrop plains over the gently folded sandstone, shale and limestone. These may be linearly oriented along strike lines and associated with *Acacia*, *Atalaya*, *Ventilago* and *Dolichandrone*. Cracking clay plains on the sedimentary rocks carry tussock grasslands of *Astrebla*, *Dichanthium* and *Chrysopogon*. The tributary alluvial plains of the Fitzroy River consist mainly of *Grevillea striata* and *Lysiphyllum cunninghamii* low woodland with *Triodia* and *Chrysopogon*. The stable and active flood-plains carry *Astrebla* and *Chrysopogon*-*Dichanthium* tussock grasslands, with *Acacia suberosa* as an important associate, and *E. papuana* and *E. microtheca* woodland alliances. Lining the main channels are *E. camaldulensis*-*Terminalia platyphylla* fringing communities. Coastal flats have fringing mangrove forests. Open grasslands of *Xerochloa* spp. occur on the margins of saline influence.

The Dampier botanical district contains extensive areas of sand plains which lack surface drainage. The dominant layer in the vegetation is composed of *Acacia*, the more important species being *A. tumida*, *A. eriopoda*, *A. pachycarpa*, *A. holosericea* and *A. monticola*. *E. dichromophloia* and *E. zygophylla* make up the tallest stratum of the low woodland formation containing these *Acacia* species. Other tree genera include *Gyrocarpus*, *Atalaya*, *Hakea*, *Grevillea*, *Lysiphyllum*, *Persoonia* and *Erythrophleum*, with the occasional *Adansonia*. In the high rainfall area, a woodland formation of *E. miniata* alliance is present. This alliance also has a strong layer of *Acacia* shrubs. In this district *E. tetradonta* is not associated with *E. miniata* as it is in the Gardner botanical district. The grass ground storey is predominantly *Plectrachne pungens*-*Chrysopogon* spp. Shallow valleys, pans and depressions, which may be up to five kilometres wide, carry woodlands of *E. polycarpa*, *E. tectifera*, *E. microtheca* and *Melaleuca* spp. alliances, with various tall grasses. The saline coastal flats carry *Sporobolus virginicus* and *Halosarcia* spp. communities.

The Eremaean Province, which lies between the predominantly summer and predominantly winter rainfall patterns of the north and the south-west, respectively, is intermediate in character. The rainfall, which over most of the province is less than 400 mm per annum, is received either from extensions of summer rainfall southward or from northern extensions of the southern winter systems. The vegetation of the province varies from woodland, high shrubland, low shrubland to hummock grassland. Eleven botanical districts have been broadly recognised, seven of them in the desert area.

The Fortescue botanical district, usually placed in the Northern Province, consists of the Pilbara block. This district is intermediate in character between the Northern and the Eremaean Provinces. It consists of granite plains to the north and west, rising gently inland to a capping of basalt in the Chichester Range and beyond this to the dolomite and jaspilite of the Hamersley Range. The vegetation of the narrow coastal strip carries grasslands of *Eragrostis* and *Eriachne* and low open shrublands of *Acacia translucens*-*A. inaequilatera* alliance. *Acacia pyrifolia* high open shrubland alliance is present on granite and basalt soils. *Acacia* alliances have a strongly developed *Triodia pungens* hummock grassland ground layer. High shrubland and low woodland *A. aneura* alliance is found along the major valleys and southern flanks of the Hamersley Range. A sparse shrub layer and a short grass ground flora composed of *Eragrostis* (Love Grass), *Eriachne* (Wanderrie Grass) and *Aristida* characterise these communities. On the Proterozoic rocks of the Hamersley Range the characteristic vegetation is a low open woodland formation, with *E. leucophloia* alliance. Hummock grassland ground layer found on stony soils consists mainly of *Triodia wiseana* and *T. basedowii*. Low woodland formations of *E. dichromophloia*-*E. setosa*, with *Triodia basedowii* as ground cover, occur on the sand plains. *E. camaldulensis*-*Melaleuca leucadendron* fringing communities line the permanent pools of the Fortescue River. Coastal flats have fringing mangrove scrub.

The Ashburton and the Austin botanical districts are separated by rainfall patterns. The former, with its rainfall more likely to occur in summer, and the latter, with its rainfall more likely to occur in winter, both carry extensive low woodland and high shrubland formations of *A. aneura* alliance but, whereas the northern alliance is associated more with grass genera such as *Aristida*, *Eragrostis*, *Eriachne*, *Panicum*, *Brachiaria*, *Triodia* and *Setaria*, the southern alliance is associated more with genera such as *Danthonia*, *Eremophila*, *Maireana*, *Bassia*, *Helipterum*, *Cephalopterum*, *Velleia*, *Swainsona* and other herbaceous annuals. *A. aneura* alliance consists of a number of sub-alliances and associations. These include the *A. aneura*-*Eremophila leucophylla*, *A. aneura*-*E. fraseri*, *A. aneura*-*A. tetragonophylla*, *A. aneura*-*A. craspedocarpa*, *A. aneura*-*A. sclerosperma*, *A. aneura*-*A. linophylla*, *A. aneura*-*Callitris huegelii*, *A. xiphophylla*-*A. grasbyi* and *A. sclerosperma*-*A. ramulosa* sub-alliances. *E. kingsmillii* is associated with *A. aneura*, and with a hummock grassland ground layer. *Maireana pyramidata* is associated with *A. aneura* on saline alluvial plains. Other woody genera that are prominent in the *A. aneura* alliance are *Hakea*, *Grevillea*, *Atriplex*, *Frankenia*, *Plagianthus*, *Heterodendron* and

Brachychiton. The upper margins and floors of pans and salt lakes in the Austin district carry a *Halosarcia* spp. alliance. Fringing these flats are *Melaleuca uncinata* communities. The drainage channels are fringed by *E. camaldulensis* and *E. coolabah* (Coolibah) alliances.

The Carnarvon botanical district, a sedimentary basin in which the exposed surface rocks range from Permian to Recent in age, is mostly low-lying. The vegetation on the northern plains consists of *Acacia xiphophylla* high open shrubland with *Triodia basedowii* as ground cover. On the sand plains the vegetation is predominantly *Acacia pyrifolia* open shrubland, with scattered *Owenia reticulata*, and with *Triodia pungens* and *Plectrachne schinzii* as ground cover. On Cape Range *E. dichromophloia* low open woodland, with *Triodia pungens* and *T. wiseana*, is to be seen. *Acacia* species such as *A. coriacea*, *A. ramulosa*, *A. sclerosperma*, *A. xiphophylla*, *A. tetragonophylla*, *A. grasbyi* and *A. ligulata* form high open shrubland or low open woodland communities with shrub species of other genera over a wide area of this botanical district. On alluvial flats the low shrub understorey layer consists of species of *Maireana* and *Atriplex*. *Halosarcia* low open shrubland occupies the wetter sites. On Kennedy Range a mixed open shrubland with *Triodia basedowii* and *T. pungens* as ground cover is present.

The Canning, Mueller, Kertland, Carnegie, Giles and Helms botanical districts comprise what was once called the Carnegie botanical district. These make up the desert region of Western Australia.

The Canning and Mueller districts contain extensive areas of high shrubland with several species of *Acacia* dominating. On the sandy plains the dominant species is *A. pachycarpa* with *Triodia pungens* as ground cover. Scattered trees of *Eucalyptus* sp. (Desert Bloodwood) are present on the dunes. *Owenia reticulata* (Desert Walnut) is the principal low tree species in the north-western sector. *E. pachyphylla* and *E. odontocarpa* are prominent in the north-eastern sector, while woodlands of *Casuarina decaisneana* are also of local importance there, in the interdunes. The ground layer of hummock grassland includes *Triodia* and *Plectrachne*. *Grevillea wickhamii* and *Acacia monticola* are dominant on stony rises. Low trees of *E. pruinosa*, *E. brevifolia*, *E. setosa* and *E. coolabah* occur at a very low density.

The Kertland district has a noticeable abundance of *Thryptomene maisonneuvei* and other Myrtaceae in the high shrubland formation. The Desert Bloodwood is present on the dunes, together with *Plectrachne schinzii*. *A. aneura* is of local importance, on small hills and mesas, with *Triodia pungens*. Hills of igneous rocks are covered with *Plectrachne melvillei*.

The Carnegie district carries extensive areas of *A. aneura*, with *Danthonia* and seasonal ephemerals. On the rises of the lateritic plains hummock grasslands of *Triodia basedowii* and high shrublands with *E. kingsmillii* merge in with the *A. aneura* which tend to thin out. Desert Bloodwood, *Casuarina decaisneana*, and *E. coolabah* become more local in distribution, while *Plectrachne schinzii* is increasingly replaced by *Thryptomene maisonneuvei* southwards.

The Giles district consists of ranges with sandhill country between them, somewhat similar to the Carnegie district. *Casuarina decaisneana* groves are very common in sandhill country between the ranges. *Triodia basedowii* and *Plectrachne schinzii* provide ground cover. On the ranges the high shrubland is made up predominantly of *Acacia* spp. including *A. aneura*, with *Eremophila*, *Hakea*, *Grevillea* and *Eucalyptus* as co-dominants in some areas. *Callitris columellaris* is locally dominant. *Triodia basedowii* and *Plectrachne melvillei* form the hummock grassland ground layer. The *A. aneura* alliance, prominent on basalt soils, has a ground flora of seasonal ephemerals and scattered *Eremophila* and *Cassia*.

The Helms district contains extensive areas of *A. aneura* alliance. A high shrubland formation characterised by *E. youngiana* alliance is also well developed. Associated with the shrubland community are other tall shrubs such as *Hakea*, *Acacia*, *Melaleuca*, *Grevillea* and other *Eucalyptus* species. Patches of open woodland of *E. gongylocarpa* are restricted

apparently to areas where the sand is deeper. The hummock grass associated with *E. youngiana* and *E. gongylocarpa* is *Triodia basedowii*.

The *Eucla* botanical district, commonly referred to as the Nullarbor Plain, is dominated by a low shrubland formation of *Maireana sedifolia*. *Atriplex*, *Stipa* and seasonal ephemerals are well represented. Towards the margin a low open woodland of *Acacia sowdenii* alliance, with a shrubland understorey of *Maireana* and *Atriplex*, becomes more and more evident. To the north this is replaced by a low woodland made up of *Acacia aneura*, *Casuarina cristata* and *Myoporum platycarpum*. Along the coastal strip low woodlands of *E. socialis*, *E. gracilis* and *A. sowdenii* alliances are to be seen on the ridges and flats, respectively. *E. transcontinentalis*-*E. flocktoniae* woodland alliance, found in the extreme south-western portion, forms a continuum with a similar formation in the Coolgardie botanical district.

The *Coolgardie* botanical district marks the transition from the South-West Province to the Eremaean Province, from the Eucalyptus zone to the Acacia zone. In this district a high degree of variability occurs within Eucalyptus and Acacia. It is thought that this variability may have been due to climatic oscillations known to have occurred since the Pleistocene period, thus making many of the 'species' of recent origin. The vegetation is a mosaic of woodland and shrubland formations. Woodland formations include *E. salmonophloia*, *E. transcontinentalis*-*E. flocktoniae*, *E. torquata*-*E. lesouefii*, *E. dundasii*-*E. longicornis*, *E. brockwayi* and *Acacia aneura* alliances. Shrubland formations include *Grevillea eriostachya*-*G. didymobotrya*-*G. excelsior*, *Eucalyptus foecunda*, *E. eremophila* and other mallee or shrub eucalypts, *Acacia* spp.-*Casuarina* spp.-*Melaleuca* spp. and *Acacia aneura* alliances. Salt lakes and salt pans are associated with halophytic communities of *Halosarcia* and *Atriplex* alliances.

The *South-West Province*, which receives its rainfall in winter and has a warm to cool temperate climate, has a high degree of endemism in its flora. The degree of endemism is most powerfully expressed in the cusps of its triangular-crescentic area particularly in the high shrubland and heath formations found to the north of the Hill River and to the east of the Fitzgerald River. Large areas of this province have been altered greatly by man and contain a high proportion of the naturalised alien species recorded in the State.

The *Darling* botanical district consists of four subdistricts. The *Warren* subdistrict, which occupies the extreme south-western corner of Western Australia, has an annual rainfall in excess of 1,200 mm. The main vegetation formations are the high open forest, on granite soils represented by *E. diversicolor* alliance; open forest on lateritic soils represented by *E. marginata*-*E. calophylla* alliance; low forest and scrub of *Agonis flexuosa* on extensive coastal dunes; also on sand dunes, heaths, with *Jacksonia horrida*-*Acacia decipiens*; and sedgelands of *Evandra aristata*-*Anarthria* spp. in waterlogged areas. Seasonally flooded areas may also carry a *Melaleuca preissiana* low forest alliance. Small patches of *E. cornuta* woodland are to be seen on dune sands. Other species associated with the alliances include *E. jacksonii* and *E. guilfoylei* with *Banksia grandis*, *B. littoralis*, *Casuarina decussata*, *Agonis flexuosa* and *A. juniperina* as understorey trees and a dense high shrub layer of *Trymalium*, *Chorilaena*, *Hovea elliptica*, *Acacia pentadenia*, *Albizia* and *Pteridium*, (in *E. diversicolor* alliance) and *E. patens*, *E. megacarpa* and *E. rudis* with *Banksia grandis*, *B. littoralis*, *Casuarina fraserana*, *Persoonia longifolia*, *P. elliptica*, *Nuytsia floribunda* and *Xylomelum occidentale* as understorey trees and a low shrub heathlike groundlayer (in *E. marginata*-*E. calophylla* alliance).

The *Menzies* subdistrict marks the transition from the Warren subdistrict, with its high rainfall, to the Dale subdistrict where the annual rainfall for the most part scarcely exceeds 600 mm. The vegetation is predominantly *E. marginata*-*E. calophylla* open forest, merging eastwards into *E. wandoo* and *E. cornuta* woodlands.

In the *Drummond* subdistrict the narrow strip of Recent or Pleistocene sand dunes carry scrub or low forests of *Agonis flexuosa* alliance at the southern edge, with *Acacia rostellifera*-*A. cyclops*-*A. cochlearis* alliance and sand dune complex over most of its length. Inland and

parallel to the coastal dune system is a narrow belt of coastal limestone hills, the natural habitat of *E. gomphocephala* woodland alliance. This alliance has an understorey tree layer of *Banksia grandis* and *Agonis flexuosa*, with a sparse shrub layer. The greater part of the Perth basin is mantled with aeolian sands. The northern sector carries a low forest formation of *Banksia menziesii*-*B. attenuata*-*Casuarina fraserana*-*E. todtiana* alliance, with a heath understorey, and smaller areas of *B. prionotes* alliance; the southern part is dominated by a *E. marginata*-*E. calophylla* open forest or woodland alliance, with a heath understorey, and smaller areas of *Banksia* low forest. Poorly drained swampy areas carry *Casuarina obesa* low forest alliance; *Actinostrobus pyramidalis* (Swamp Cypress Pine) is of local significance. Swamp and fen formations are made up of complex communities of sedgeland. Watercourses in the district are fringed by a *E. rudis*-*Melaleuca* spp. alliance.

The Dale subdistrict occupies the laterite capped plateau dissected by young streams to form steep-sided valleys. An open forest formation of *E. marginata*-*E. calophylla* alliance characterises the lateritic erosional and deep depositional surfaces, with *E. wandoo* alliance restricted to the heavier pediment soils. The understorey layers of the *E. marginata*-*E. calophylla* alliance resemble those in the same alliance in the Warren district. The *E. wandoo* understorey layer has a more open character. This alliance, which in its most highly developed state fringes the eastern boundary of this district, is more widely distributed in the Avon botanical district.

The Irwin botanical district, for the most part, overlies sedimentary rocks from Silurian to Quaternary age, with smaller areas of Precambrian metamorphics. This district forms one of the two floristically important cusps of the South-West Province. At the northern extremity, the Irwin district consists of red and yellow sands underlain by Mesozoic sediments. High shrubland formations are made up of mixed high shrubland with a heath understorey, with mainly Proteaceous and Myrtaceous elements, *Acacia* spp.-*Casuarina acutivalvis* and *Melaleuca* spp. and *Hakea* spp. scrub alliances. Low woodlands of *Banksia menziesii*-*B. attenuata*, *B. ashbyi*-*B. sceptrum*, *B. prionotes* and *Actinostrobus arenarius* occur on deep sands. Heath and low heath formations of Proteaceae, Myrtaceae, and Leguminosae occur in areas where the sand is shallow or where a lateritic crust is present. These formations vary considerably in floristic composition.

On the metamorphic rocks, the vegetation on residual flat tops and plateau surfaces carries low forests of *B. prionotes* alliance with heath on the lateritic surfaces. A low woodland formation of *E. loxophleba*-*Acacia acuminata* alliance dominates the loamy valley soils, now extensively used for farming. This alliance is associated with a herbaceous ground layer composed of *Stipa*, *Neurachne* and seasonal ephemerals. *E. salmonophloia* alliance is significant only in the eastern part of the district.

The vegetation of the coastal dune system is an extension of the Darling district. The limestone hills in the Irwin district carry low woodlands of *E. erythrocorys*. Poorly drained areas and small lakes carry or are fringed by *Casuarina obesa* and *E. rudis*-*Melaleuca* spp. alliances.

The central to southern portions of the Irwin district are characterised by the so-called 'sand plains'. These carry low woodlands of *Banksia menziesii*-*B. attenuata*-*E. todtiana* and *B. prionotes* alliances particularly on the deeper sands. *E. lane-poolei* (Salmonbark Wandoo) and *E. accedens* (Powderbark Wandoo) are of local significance, on heavy clay soils. In areas of deep dissection, the valleys carry woodlands of *E. wandoo* and *E. calophylla* alliances. Heath and low heath formations cover most of the elevated regions. The heath communities vary in composition, depending upon the depth of sand and the presence of laterite, and some may eventually develop into high shrubland communities with long-term fire protection. Proteaceae, Myrtaceae and Leguminosae are dominant components, while on laterite hills *Xanthorrhoea reflexa* and *Dryandra* spp. become very conspicuous. *Banksia hookerana* alliance is locally sig-

nificant north of the Arrowsmith River. High shrubland communities with *Grevillea eriostachya*-*G. didymobotrya*-*G. eriostachya*, *Lambertia multifloras* (Native Honeysuckle) and *Actinostrobilus arenarius* alliances are also significant in the sandplain region.

The *Avon* botanical district, which covers most of the so-called wheat belt, is now for the most part cleared of native vegetation for farming.

On the eastern edge of the Darling district, on the low hilly to hilly terrain, with hard acidic yellow mottled soils, the pediments of early erosional cycles, the woodland formation consists of *E. wandoo* alliance. *E. marginata*-*E. calophylla* alliance occurs on soils which tend more to ironstone gravels with a sandy matrix. *E. wandoo* alliance is associated with *E. accedens*, and with *E. astringens* which commonly occur on lateritic breakaways. In the southern portion *E. gardneri* (Blue Mallet) and *E. falcata* (Silver Mallet) are more commonly seen on the breakaways, while *E. cornuta* woodland alliance replaces the *E. wandoo* woodland alliance. *E. wandoo* woodland has a very open low shrub layer. Poisonous plants of the genera *Gastrolobium* and *Oxylobium* are commonly seen in this woodland formation. On granite outcrops, a vegetation complex reflects the succession of colonisation by algae and lichen to shrublands with *Leptospermum* and eventually to climax communities of woodland of *Casuarina huegeliana* alliance, which occur on sandy or gritty soils over one metre in depth.

On the hard neutral red soils of the river valley systems, which represent further erosional cycles, the woodland formation is represented by the *E. loxophleba* alliance, with *Acacia acuminata* as its main associate. *A. acuminata* tends to merge with the *E. wandoo* alliance, particularly as the soils become sandy or gritty. In the southern portion *E. occidentalis* alliance replaces the *E. loxophleba* alliance. *E. occidentalis* woodlands occur also on the clay soils of swamps or seasonal shallow lakes.

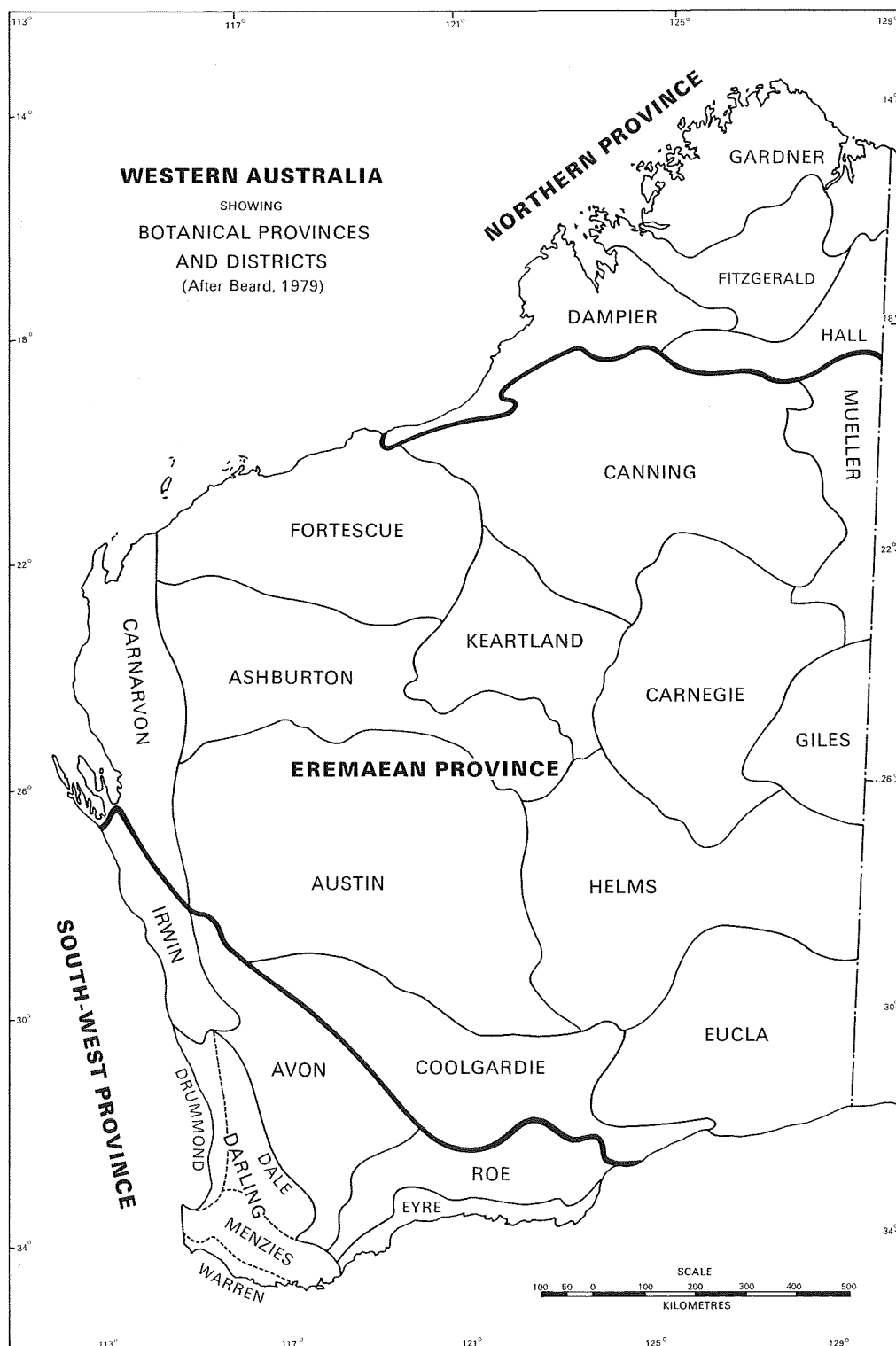
Extensive areas of *E. salmonophloia* woodland alliance are found in the hard alkaline yellow soils further to the east, on valley plains and terraces. *E. salmonophloia* woodland has an open mixed low shrub understorey with *Maireana* and *Atriplex* dominating in more saline soils. Other trees associated with this alliance are *E. salubris* (Gimlet), *E. longicornis* (Red Morrel) and *E. melanoxylon* (Black Morrel).

Forming a mosaic with the woodland formations are the low woodland and shrubland formations developed on the plateau areas, on sandy yellow earths containing ironstone gravel and over mottled or pallid-zoned clays. *B. prionotes* woodland alliance and *Acacia* spp.-*Casuarina* spp.-*Melaleuca* spp. and *Grevillea eriostachya*-*G. didymobotrya*-*G. leucopetris* shrubland alliances occur on yellow sand. *Dryandra* spp. and mixed Myrtaceae, Proteaceae, Leguminosae and Epacridaceae heath alliances occur on laterite or shallow sand over laterite. Other shrubland formations include *E. eremophila* (Tall Sand Mallee), *E. oldfieldii* (Oldfield's Mallee), *E. drummondii* (Drummond's Gum), *E. pyriformis* (Pear-fruited Mallee) and other mallee or shrub eucalypt alliances. *E. macrocarpa* (Mottlecah) shrubland occurs on deep sand.

Salt lakes, remnants of once extensive river systems, carry *Casuarina obesa* and *Melaleuca* spp. low woodland alliances on the fringes with low shrubland formations of *Halosarcia* spp. alliance in the old watercourses. *E. sargentii* (Salt River Gum) and *E. kondininensis* (Kondinin Blackbutt) grow on saline soils.

The *Eyre* botanical district, which includes the Stirling and Mount Barren Ranges, forms the second of the two floristically important cusps of the South-West Province. It lies at the edge of the Archaean Shield where it abuts into the Proterozoic metamorphics of the Albany-Esperance block. The latter consists largely of sediments of middle and late Eocene age, at one time mantled by a lateritic crust, which is represented in the present landscape by narrow ironstone gravel ridges and erosional scarps along the northern edge.

The Stirling and Mount Barren Ranges which rise abruptly out of an otherwise predominantly undulating landscape are composed of hard Proterozoic metasedimentary



rocks. The ranges carry closed heath and scrub formations of mixed Myrtaceae, Proteaceae, Leguminosae and Epacridaceae alliance. They are noted for their diversity in the flora and their conspicuous endemic or near endemic species. Woodlands of *E. marginata*-*E. calophylla*, *E. wandoo* and *E. cornuta* occur on the lower slopes and valleys of the Stirling Range.

Over a large area of the Eyre district, the vegetation is made up of high shrubland formations with shrub or mallee eucalypts dominating. *E. tetragona*, *E. redunca*-*E. uncinata*, *E. gardneri*-*E. nutans* and *E. eremophila*-*E. oleosa* alliances form a mosaic over the area, the former on the undulating upper slopes and rises nearer the coast. Patches of mixed heath and low heath of Proteaceae, Myrtaceae and Leguminosae are present. The heath vegetation merges into and forms the understorey of the high shrubland communities. Low forests of *E. platypus*-*E. gardneri*-*E. falcata* alliance occur locally on scarp slopes. To the east *E. tetragona* alliance gives way to *E. tetragona*, while on the sandy soils *Banksia speciosa*-*Lambertia inermis* and *Nuytsia floribunda* become dominant.

Woodland formations of *E. occidentalis*, *E. loxophleba* and *E. salmonophloia* alliances occur along drainage lines and loamy slopes and flats. The former alliance is favoured by higher rainfall and winter wet sites and is often seen on or around clay pans. Salt lakes are covered by or fringed by low shrubland formations of *Halosarcia* spp. and *Atriplex* spp. alliances. A scrub formation of *Melaleuca* spp. alliance may also be present.

The littoral fringe of the coastal plain is made up of a chain of granite bosses with drift sand between them. *Acacia rostellifera*-*A. cyclops*-*A. cochlearis* and *Agonis flexuosa* scrub alliances are present with the sand dune and granite lithic complexes. *Banksia baxteri* and *B. attenuata*, as well as *Lambertia inermis* (Chittick), are dominant on the drift sand, inland, with *E. marginata* and *E. cornuta*, the former found to the west, the latter restricted to interdunal flats. Coastal swamps carry a *Melaleuca* spp. alliance. Islands of the Recherche Archipelago carry low forests of *E. cornuta* and *E. conferruminata* as well as mixed scrub and heath formations.

The Roe botanical district contains a number of plant communities found in the adjacent Eyre, Avon and Coolgardie districts. On residual sandplains there are extensive areas of mixed heath. These merge into *E. eremophila*-*E. oleosa* and *E. redunca*-*E. uncinata* tall shrublands. *E. forrestiana* (Fuchsia Mallee) is present in these alliances. Further to the east, on limestone, the tall shrubland is dominated by *E. cooperana* (Many-flowered Mallee). Patches of *E. falcata* and *E. gardneri* occur on higher ground, particularly to the west. *E. platypus* low forest is found in pockets on clay soils, *E. salmonophloia* and *E. occidentalis* woodlands are seen in the valleys, the former to the north, the latter mainly to the south.

The salt lakes carry *Halosarcia* spp. low shrubland communities. These are fringed by *Melaleuca* spp. low woodland or shrubland communities. The dominant species are *M. lateriflora* and *M. uncinata*.

Naturalised Flora

The naturalised flora of Western Australia which now makes up so much of the landscape of the South-West Province is composed of elements from many parts of the world. These plants have in some instances been deliberately introduced, others have been introduced by accident. Some species have been introduced on more than one occasion and several variants may be present. The more successful species originate from areas of similar climate, and in the absence of disease and insect attack, which in their native habitat would keep them in check, are able to disseminate at an alarming rate. South Africa and the Mediterranean Region provide most of the successful alien species found in the South-West Province.

Grasses of importance are represented by the genera *Bromus* (Brome Grass), *Lolium* (Rye Grass), *Hordeum* (Barley Grass), *Avena* (Oats), *Aira* (Silver Grass), *Briza* (Blowfly Grass), *Poa* (Winter Grass), and *Vulpia* (Silver Grass) from Southern Europe, and *Eragrostis* (Love Grass), *Ehrharta* (Veldt Grass) and *Rhynchelytrum* (Red Natal Grass) from South Africa. Pasture

legumes from southern Europe include *Trifolium* (Clover), *Medicago* (Medic, Lucerne), *Lupinus* (Lupin), *Ornithopus* (Serradella), *Vicia* (Vetch) and *Lotus* (Birdsfoot Trefoil). *Psoralea pinnata* (African Scurf Pea) from South Africa is a shrubby weed.

The weed flora of Western Australia is composed largely of alien species. Very few native species have become weeds in this State. The ubiquitous composite *Arctotheca calendula* (Cape Weed) originates from South Africa, as do *Arctotis*, *Berkheya*, *Osteospermum*, *Gorteria*, *Cotula* and *Ursinia*. Naturalised European composites include *Carthamus* (Saffron Thistle), *Hypochoeris* (Flat Weed), *Carduus* (Slender Thistle), *Dittrichia* (Stinkwort), *Lactuca* (Lettuce), *Conyza* (Fleabane), *Centaurea* (Cockspur Thistle) and *Cirsium* (Spear Thistle). The Brassicaceae, significant as crop weeds, comprise *Raphanus* (Radish), *Brassica* (Turnip), *Rapistrum* (Turnip Weed) and *Sinapis* (Charlock). *Carrichtera annua* (Ward's Weed) is widely naturalised in the Eucla district. All these are of European origin. The South African Iridaceae are represented by genera such as *Homeria* (Cape Tulip), *Watsonia*, *Gladiolus*, *Moraea*, *Ixia* and *Sparaxis* and were introduced in the first instance as garden subjects. *Echium* (Paterson's Curse) (Boraginaceae) was another garden introduction, while *Rubus* (Blackberry) (Rosaceae), a woody species, was introduced for its fruit. *Oxalis* (Soursob) (Oxalidaceae), from South Africa, is common in vineyards and orchards, while the family Polygonaceae is represented by *Rumex* (Dock) and *Emex* (Double Gee), weeds of wide habitat. The latter, introduced as a spinach from South Africa, is now extremely widely distributed in the South-West and Eremaean Provinces. Also widely distributed is *Argemone* (Mexican Poppy) (Papaveraceae), with origins in North America. *Prosopis* (Mesquite) (Mimosaceae) and *Parkinsonia* (Ceasalpiniaceae) from the Americas, and *Calotropis* (Asclepiadaceae) from Africa, are weedy shrubs or small trees naturalised in the tropics.

In addition to the naturalised alien species which now exceed 750 in number, there are hundreds of species of plants under cultivation in Western Australia. These include field crops (cereals, legumes, fibre and oil seeds), horticultural plants (fruit, vegetables and garden subjects) and forest trees. Other species are being deliberately introduced for particular purposes, e.g. the reclamation of waste land and saline areas.

As man's activities further impinge upon the natural ecosystems and as more and more alien plants become naturalised in this State, so will the effect of these plant species be more widely felt in the natural environment. It is essential to have information on the biology of alien species so that proper management measures can be applied to maintain harmony within our natural ecosystems.

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Chapter II— continued

Part 4—The Fauna of Western Australia

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DISTRIBUTION

Terrestrial Vertebrates

An observer who looks carefully at the fauna of a large land mass like the Australian continent will soon discover that its animals are not distributed uniformly throughout it. He will find that groups of species which are characteristic of some places are missing from others. This is because the distribution of animals results both from their response to the physical (*i.e.* ecological) conditions of their environment (and these are not uniform from place to place), and from their past histories. For example, the presence of routes along which a species could have moved in the past, and of barriers which would have made its movement from one place to another impossible, decide whether any species could have reached a particular locality by today. But whether it has persisted there until today depends upon local conditions having been suitable for it.

The relationship between the distribution of a species and the character of its environment may be demonstrated dramatically and most easily by comparing the distribution of animals with that of climate, and in particular with its components of temperature, rainfall and the time of the year at which rain falls. In Western Australia many species lie within one or other of the boundaries of two rather different climatic regions. These are the south-west with its regular and plentiful rainfall during cold winters, and the Kimberley with regular, plentiful rainfall during hot summers. The remainder of the State receives intermittent and unreliable rainfall in quantities which vary widely; some parts of this area (*e.g.* the Pilbara) receive their small amount of rain principally in the summer and other parts (*e.g.* the Nullarbor) in the winter.

An analysis of most of the Western Australian groups of vertebrate animals shows that they can be referred to three faunal assemblages characteristic of these climatic regions. These assemblages are called *faunas* and have been named by zoogeographers *Bassian* which, in this State, is the fauna characteristic of the south-west; *Torresian* which, in this State, is characteristic of the Kimberley; and *Eyrean* which is the fauna which occupies the land between. While the composition of a fauna is, generally speaking, characteristic of the area in which it occurs, the occurrence of a particular species in a fauna does not mean that it will not be found in another because each of the faunas has several elements which are sufficiently wide in their requirements for them to occur as 'foreigners' in the faunas of neighbouring regions. Examples of these are the species with predominantly Torresian populations (and apparently histories of origin) which are found today in the otherwise Eyrean fauna of the Pilbara district of the north-west; and various Eyrean species which occur in the Bassian fauna of the south-west.

Among the birds the sharpest faunal break is between the Torresian fauna of the Kimberley division and the Eyrean fauna of the Pilbara. The Kimberley is the headquarters in Western Australia of the Scrub Fowl (*Megapodius freycinet*), the Fruit Pigeons (Ptilinopinae), Lorikeets (*Trichoglossus* and *Psitteuteles*), the White Cockatoo (*Cacatua galerita*) and most of the Grass Finches. The Torresian species which penetrate further southwards include the Brolga (normally only to Onslow), White-breasted Wood Swallow (to Shark Bay), and the Brown Honeyeater (right through to the south-west).

Among mammals there seem to be a few truly Torresian species in Western Australia. Examples would be the Fruit Bats or Flying Foxes (*Pteropus* and *Macroglossus*), the Little Rock Wallaby (*Peradorcas concinna*), the Jungle or River Wallaby (*Macropus agilis*) and the Antelope Kangaroo (*Macropus antilopinus*). On the whole most of the mammal species which occur in the Kimberley seem to be characteristic of that part of the Eyrean fauna inhabiting the country which receives intermittent rainfall during the summer.

Even among birds, the boundary between the majority of the Eyrean species and the bulk of the Bassian species is less well defined than that which separates Eyrean and Torresian faunas as there is a good deal of overlapping. For example, the line which separates the woodland eucalypts and the mulga, the so-called 'mulga-eucalypt line', is the extreme limit of most Bassian species, though many do not range inland beyond a line connecting Geraldton, Moora, Northam and the Stirling Range. The mulga-eucalypt line separates, to quote an example, the main distributions of the Grey Kangaroo (Bassian) and the Red Kangaroo (Eyrean). This line is the northern limit of other well known Bassian species such as the Red Wattle Bird.

The south-west of the State has representatives of many well known Bassian species also found in south-eastern Australia. These include among birds, the Brush Bronzewing, White-tailed Black Cockatoo, Western Rosella, Scarlet Robin, Yellow Robin, Southern Emu-Wren, Silvereye, White-naped Honeyeater, Western Spinebill, New Holland Honeyeater and Red-eared Firetail. Among mammals there are the Pigmy Possum, the Wambenger, the Grey Kangaroo, the Tammar Wallaby, the Brush Possum and various dunnarts (marsupial mice, *Sminthopsis*). Among frogs there are various *Crinia* and *Heleioporus inornatus* and *australiacus*; and fishes such as *Galaxias* and *Nannoperca*. However, there has been an extensive intermingling of Eyrean and Bassian elements in the south-west on a scale not paralleled in south-eastern Australia. In the south-west we have a blend of faunas in the sclerophyll forests which, though essentially Bassian in character, contain such Eyrean intrusives as the Purple-crowned Lorikeet, the Twentyeight Parrot, the Rufous Tree-creeper, the Western Warbler, the Banded Blue Wren and the Red-tipped Diamond-bird.

It must be recognised also that the distribution of animals that we see today may be a very recent pattern, and subject to continual fluctuation. Studies of fossil pollen in the south-west suggest there have been fluctuations in the relative abundance of jarrah, marri and karri trees over the last few thousand years. Even more marked fluctuations in vegetation may have been produced by climatic changes accompanying glaciation and deglaciation in high latitudes and altitudes over the past two million years. Marked changes in vegetation would usually be accompanied by changes in fauna. We know that the Marsupial Wolf or Tiger (*Thylacinus*), the Koala (*Phascolarctos*) and other marsupials, some of them now extinct throughout their ranges in Australia, once lived in the south-west, and it is possible that climatic changes were responsible for their vanishing from that area of Western Australia.

Climatic alterations, on a minor scale, are constantly going on. In the past half-century, or longer, there has been a considerable change in northern Europe, Asia and America, an amelioration in some parts and a drying-up in others, with widespread effects on the distribution of animals. Something similar appears to have been taking place in Western Australia. Many dry-country bird species, of the Eyrean faunal assemblage, have made notable extensions of range into the south-west corner. These include the Galah, Little Corella, Budgerygah, Smoker Parrot, Crested Pigeon, Black-faced Woodswallow, Crested Bell-bird, Blue-and-white Wren, Black-throated Butcher-bird and Little Crow. The records of local naturalists, who keep district lists of local birds and mammals over a period of years, are very useful sources of data for plotting these changes. Frequent Museum surveys will provide more positive information.

In some cases distribution changes due to natural causes may be masked or modified through the alterations of habitat due to settlement. These habitat changes act to the detriment of woodland birds but favour open-country species (like pipits and plovers).

Coastal Marine Fauna ⁽¹⁾

The nature of the coastal waters varies from the warm mangrove-lined mud flats of the north to the clean sandy bays and cool crystal-clear waters of the south. The types of coastal marine habitats depend on the range of tide, the exposure to oceanic swells, the sediments carried off the land by wind or river and some local biological activities such as reef coral or algal building. There is a gradual change in water temperature, salinity and other physical characteristics of the sea as one moves along the long Western Australian coastline of 12,500 kilometres; these changes reflect the nature of the adjacent water mass modified by local effects such as occur in large and small embayments, near river mouths or behind protecting headlands. The coastal waters may be divided into the following broad zones:

1. North: from the Western Australian-Northern Territory border to Cape Leveque with very broken coastline, a high tidal range, high runoff from well vegetated hinterland and no exposure to heavy oceanic swell.
2. North-north-west: from Cape Leveque to Cape Keraudren with eighty miles of low beach, a high tidal range, little regular runoff from desert sands which are blown into the sea by the 'South-East-Trades'.
3. North-west: from Cape Keraudren to North West Cape with an indented coastline, moderate tidal range, irregular runoff from some mountains and desert sands.
4. West-north-west: from North West Cape to Kalbarri with some high cliffs, a deep embayment (Shark Bay), moderate tidal range, irregular low runoff from little vegetated desert hinterland and exposure to the south-west oceanic swell. A barrier coral reef, unique in Western Australia, runs southward from North West Cape for nearly 160 kilometres.
5. West-south-west: from Kalbarri to Cape Naturaliste with fairly smooth low white sandy coastline and some limestone headlands; rainfall moderate with little runoff from coastal sands, water clear; tidal range low, offshore coastal reefs give some protection to the coast from the south-west swell.
6. South-west: from Cape Naturaliste to Israelite Bay with broken headland and surf beach formations, high south-west swell exposure, low tidal range, many inlets and low-volume river discharges.
7. South-east: from Israelite Bay to the Western Australian-South Australian border with smooth coastal outline of beaches and some cliffs, modified exposure to south-west swell, low tidal range and low rainfall runoff.

Certain coastal marine areas are special in the sense that they represent either a transition (*i.e.* rapid change of character) between two adjacent zones or possess unique features found in such combinations nowhere else on the coast. Examples of such special places are the coastal waters in the Broome to Derby region, around North West Cape, in Exmouth Gulf, in Shark Bay, the Perth metropolitan beaches (including Cockburn Sound), around Cape Naturaliste and around Cape Leeuwin.

The islands and reefs off the coast are also regarded as special because of their marine faunal peculiarities; for example, the Houtman Abrolhos, the Monte Bellos, the Rowley Shoals, the North West Cape Barrier Reef and the Archipelago of the Recherche.

The marine fauna of the north coast is distinct from that of the south coast although a few species do occur in both regions. The northern fauna is regarded as part of the Indo-West Pacific fauna, and the southern fauna of Western Australia as part of the southern Australian fauna. Some species of both these faunas extend and overlap along the west coast and there are several species which are endemic to this region only. One of these is the Western Australian commercial rock lobster *Panulirus cygnus* and another is the Western Australian commercial jewfish *Glaucosoma hebraicum*.

⁽¹⁾ Written in collaboration with Dr R. W. George.

Fauna of Inland Waters ⁽²⁾

The inland waters are of many types and possess very varied faunas. They may be divided into four main ecological groupings: (1) the rivers of the Kimberley Division; (2) the river systems of the north-west from the De Grey to the Murchison; (3) the streams, swamps, and lakes of the south-west corner; and (4) the temporary waters of the dry inland represented by two widely different habitats, (i) freshwater claypans and soaks (including man-made dams) and (ii) the salt lakes.

Marked seasonality characterises river flow in the Kimberley Division because of the alternation of regular summer rain with winter drought. The river pools and many isolated springs support an extensive fauna of fish, insects, molluscs and other animals, many of which show close affinities with the aquatic fauna of Asia and the Indo-Malay Archipelago.

The rivers of the north-west from the De Grey to the Murchison flow only intermittently, and between times of flood the fauna must survive in widely separated spring-fed pools in river beds. These pools, like those at Millstream Station on the Fortescue River, are often of striking beauty. Their fauna is relatively sparse as compared with the richer assemblages in the Kimberley rivers, the most conspicuous elements being a few fish species and a freshwater tortoise (*Chelodina steindachneri*) which is confined to the region.

The permanent hill streams of the south-west have a diverse arthropod fauna. Most of these are insects but, in addition, there are several species of freshwater crayfish in slower-running parts — Marron (*Cherax tenuimanus*) occur in permanent streams of deep water; Jilgie (*C. quinquecarinatus*) in shallow permanent water; Koonac (*C. preissi*) make burrows in the mud of swamps. A species of a closely related group, the so-called 'land crabs' (*Engaewa*), has been recently discovered in the swamps of the south-west. The freshwater mussel *Westralunio carteri* is confined to the streams of the south-west. Most rivers stagnate and may become saline in summer; they are reduced to chains of large or small pools to which the fauna is restricted. The small transparent prawn *Palaemonetes* is often abundant in these pools. Shallow permanent lakes and swamps near the coast also have a fairly varied insect fauna, among which certain species of dragonflies are particularly abundant; at times there are enormous numbers of *Daphnia* and related small crustaceans.

The inland freshwater claypans are characterised by an interesting ephemeral fauna, mainly of phyllopod Crustacea. The most conspicuous is the large shield shrimp (*Triops australiensis*) but a variety of fairy shrimps (Anostraca and Conchostraca) occur also. The eggs of these creatures survive for years in the dried mud and development is rapid when the claypans fill after occasional rains.

The most conspicuous animals in the waters of the salt lakes are the brine shrimps (*Artemia* and *Parartemia*), which at times build up to such high population densities as to attract large flocks of Banded Stilts, which breed only in certain of the inland salt lakes. The Salt Lake Snails *Coxiella* reach their greatest diversity and abundance in the south-west saline lakes.

THE COMPOSITION OF THE FAUNA

The fauna of Western Australia includes representatives of all major phyla of the Animal Kingdom and individuals range in size from the Blue Whale (*Balaenoptera musculus*), the largest mammal that has ever lived, to minute single-celled protozoa which cannot be seen without a microscope. No estimate can be made of the number of species, and probably the number of species of insects alone out-numbers all the rest by a comfortable margin. Here we have not attempted to describe all phyla. The vertebrates are given fairly full treatment because they are obvious and familiar animals to most of us. The insects (mostly those of economic importance) are dealt with in Part 5 of this Chapter, and the remaining phyla are treated in a few paragraphs which confine themselves to groups of interest.

⁽²⁾ Written in collaboration with Dr E. P. Hodgkin.

THE VERTEBRATE FAUNA

Mammals

Unlike the birds and reptiles, wild mammals are not frequently seen in most parts of Western Australia. This is because most of the species are small and secretive and appear only at night. However, there are exceptions and, as any traveller in inland and northern parts of the State can attest, kangaroos of one species or another can often be seen in large numbers during daylight hours.

Most species of mammals have distinct ecological preferences which allow them to be categorised into one or other of the three main faunal groups which are described earlier in this Part under the heading *Distribution*. For example, in the kangaroo family, the Tammar Wallaby (*Macropus eugenii*), the Quokka (*Setonix brachyurus*), and the Brush Wallaby (*Macropus irma*) are found only in the south-west or on certain isolated islands off the coast. Of these, the Brush Wallaby is closely related to the South Australian Toolache Wallaby (*Macropus greyi*) and the Tammar to the Flinders Island Wallaby and the now extinct St Peter Island Wallaby of South Australia. The most familiar kangaroo of the dry country with unreliable rainfall is the Red Kangaroo or Marloo (*Megaleia rufa*), while in the summer-rainfall country of the Kimberley Division we find such species as the Jungle Kangaroo or River Wallaby (*Macropus agilis*), the Little Rock Wallaby (*Peradorcas concinna*) and the Northern Nail-tailed Wallaby or Karrabul (*Onychogale unguifera*). In addition to the species which sort out in this convenient way, there are others which are widely distributed and in fact occur as members of all three faunal assemblages. The most familiar members of the family which do this are the Euro or Biggada (*Macropus robustus*), the Boodie (*Bettongia lesueur*), and the Rock Wallaby (*Petrogale penicillata*). Of these, the Euro may still be found anywhere in suitable local habitats from the Kimberley to the south-west and inland across the South Australian border. At one time this was true also of the Boodie and the Rock Wallaby which, however, are today unfortunately absent from much of their former range.

So far, only the kangaroos have been mentioned but, in fact, representatives of all three major divisions of the mammals (*i.e.* monotremes, marsupials and placentals) occur in the State.

The egg-laying monotremes are represented by the Echidna (*Tachyglossus aculeata*), sometimes called Spiny Anteater or Porcupine. This curious and completely inoffensive animal is not uncommon in the country around Perth and it even appears on occasions in densely-settled suburban areas. In drier districts, its diggings, made in its search for insects, are familiar around rocky hills and breakaways.

Marsupials, or pouched mammals, occur in great variety in Western Australia. The kangaroos and wallabies, already mentioned, are the herbivorous members of the group. These animals are the Australian evolutionary equivalent of the antelopes, deer, and horses of the other continents and there is often an extraordinary similarity in structure between members of the kangaroo family and these other herbivores. These similarities extend even to such details as the physiology and shape of the stomach and other organs of digestion. The reproductive systems of marsupials and their physiology have also long been of great interest to biologists because they differ from those of other animals. For example, it is now known that in the Quokka, and some other wallabies, the adults mate again immediately after the birth of the 'joey'. The embryo which is the product of the second mating does not develop immediately but is held in a dormant state in the female system. However, if the first young joey is lost from the pouch, this dormant embryo immediately begins to develop and a second joey is produced after a minimum period of time.

In Western Australia the kangaroos and wallabies are all terrestrial (there are no tree kangaroos), and even their arboreal relatives, the phalangerids, are few in number as compared with other parts of Australia. The Brush Possums, the Pigmy Possums and the Ring-tails have Western Australian representatives, but the Koalas and the striped Possums are absent, and of

the four species of flying possums of eastern Australia only one (*Petaurus breviceps*) occurs in Western Australia and that only in the Kimberley Division. Although the species of possums in Western Australia are few in number, there are some unique forms which are of great interest. One of these is the rare Scaly-tailed Possum (*Wyulda*) of the Kimberley; unlike other Australian possums this animal has a hairless scaly tail and only twelve specimens of it are known. There is also the curious and rarely-seen Honey Possum (*Tarsipes*) of the south-west. Wombats are known to have occurred in Western Australia around the turn of the century and were thought to be extinct until a small colony was rediscovered in 1965 near Caiguna in the Eucla Division.

Although the large carnivorous marsupials no longer live in the State, the smaller representatives of this group are still fairly common. There are two separate species of native-cats, a southern species (*Dasyurus geoffroii*) and a northern one (*Dasyurus hallucatus*), as well as many species of smaller carnivorous and insectivorous forms. One of the smaller members of this family, the Dibbler (*Antechinus apicalis*), one of our least-known marsupials and last recorded in 1884, was rediscovered during 1967 at Cheyne Beach near Mount Manypeaks on the south coast.

The remaining group of marsupials is that commonly called the bandicoot family. One of these, the Pig-footed Bandicoot (*Chaeropus ecaudatus*) is probably the State's rarest mammal, but it once occurred in the Nullarbor region where its remains have recently been discovered in caves and two living specimens of it were collected by John Gilbert in 1841 some miles to the north-east of Northam. No confirmed record has been made of the species in Western Australia since then. On the other hand another species of bandicoot, the Quenda, or Short-nosed Bandicoot (*Isodon obesulus*), is one of the commonest of marsupials. Its scratchings are common in country gardens and the little animal is often run over and found dead on roads. It lives largely on insects and, being nocturnal, it is seldom seen but it is nevertheless very common in many areas in the south-west.

The third main group of mammals is that of the higher mammals or placentals. Animals of this group occur in Western Australia in addition to the marsupials and the monotremes, and it always comes as something of a surprise to visitors (who generally have a strong preconception of Australia as a land in which all but introduced mammals and the Dingo are pouched mammals and monotremes) to learn that there are many species of Western Australian native placental mammals. In fact, if the seals, whales, and Dugong which occur around our coasts be counted, the species of native placental mammals outnumber the marsupial and monotreme species.

The composition of the mammal fauna is shown in the following table.

Kinds of wild mammals	Number of species occurring in Western Australia (a)	Kinds of wild mammals	Number of species occurring in Western Australia (a)
Monotremes	1	Introduced placentals —	
Marsupials	60	Rodents	5
Native placentals —		Land carnivores	2
Bats	23	Ungulates (Horses, Deer, Camels, etc.)	9
Rodents	24	Rabbits	1
Marine mammals:			17
Seals (b)	2		
Dugong	1		
Whales	22	TOTAL, ALL SPECIES	151
Land carnivores—Dingoes	1		
	73		

(a) Total numbers of species are from *A Guide to the Native Mammals of Australia* by W. D. L. Ride. (b) Only resident seals are counted. Antarctic seals are occasionally 'shipwrecked' on southern coasts but these are clearly stragglers into the area.

Within Western Australia the best-established groups of native placental mammals, *i.e.* the bats and rodents, are distributed in much the same ecological manner as are the marsupials; some are dry country forms like *Leggadina hermannsburgensis*, the small mouse which builds mounds of pebbles on stony ridges⁽¹⁾, others are predominantly animals of the wet tropics like the majority of the Fruit-bats or Flying Foxes (*Pteropus* and *Macroglossus*), while yet others are confined to the country of reliable winter rainfall in the south-west, *e.g.* the Southern Bush-rat (*Rattus fuscipes*). These native placental mammals are of great zoological interest because some of them, and in particular the native rats and mice, have been here for many millions of years and closely parallel (in adaptation to our stringent ecological conditions) their relatives in similar places in other lands. Thus, we have hopping-mice (*Notomys*), like miniature kangaroos, which are very similar in appearance and habits to the jumping-mice (Zapodidae) of the American and Eurasian dry-lands, and the jerboas (Dipodidae) of Africa; but it must be emphasised that the jumping specialisations of our own hopping-mice have evolved quite independently within Australia.

Some of our native placental mammals have been economically important. Until 1963 a shore-based Western Australian fishery at Carnarvon depended upon the migrating groups of Humpback Whales (*Megaptera novaeangliae*) which move along the western coast between their feeding grounds in Antarctic waters and their breeding places in the tropics. Until late 1978 another whale fishery, at Albany, operated upon Sperm Whales (*Physeter catodon*). The humpback fishery collapsed because of immoderate exploitation which so reduced the population that it was in danger of extinction. The sperm whale fishery ceased operations following a decision by the company on economic grounds; in addition stock analyses have shown that over-exploitation of the Sperm Whale also has been occurring. No whaling is now permitted within the 200-mile zone as a result of a policy decision by the Commonwealth Government based on recommendations from a judicial inquiry. The catching of Southern Fur-seals (*Arctocephalus doriferus*), formerly lucrative, is now no longer permitted. The Dugong (*Dugong dugon*) was once an important source of food for the natives of the coastline from Shark Bay to the Northern Territory. The Dingo (*Canis familiaris dingo*) has probably not been in Australia for as long as the other native mammals, and may well have entered with the Australoid people who were ancestral to our present Aborigines. In some parts of the State the Dingo is a major problem to the pastoral industry because of its attacks on livestock.

The preceding table also shows that there is a large number of introduced species as well as native mammals. These are now a part of the wild mammal fauna of Western Australia and all are placentals. Some of these species are also agricultural and pastoral pests and they have become so well entrenched in the environment that there is no doubt that any discussion of the mammalian fauna of the State must take them into account and mention should be made of some of them here. Red Deer (*Cervus elephus*) occur spasmodically in the south-west around Pinjarra, Waroona and Harvey. Camels (*Camelus dromedarius*) occur in large numbers and are distributed through the Eastern Goldfields up through the Pilbara and into the Kimberley. They have been declared vermin around Laverton, Nullagine, Port Hedland and Halls Creek. Donkeys (*Equus asinus*) have a distribution very much like that of the camel and also occur generally throughout the Kimberley. Wild goats (*Capra hircus*) are ubiquitous in dry country but are mainly concentrated in the Murchison and the north-west. A small herd of Black-buck (*Antilope cervicapra*) occurs near Geraldton. Rabbits (*Oryctolagus cuniculus*) are widespread in Western Australia but are only of economic significance south of the Murchison. They are by no means the problem they used to be, mainly because of programmes of intensive rabbit extermination. Foxes (*Vulpes vulpes*), declared vermin, are also widespread but do not commonly occur north of the De Grey River, having only been reported spasmodically from the Kimberley Division. The domestic cat run wild (*Felis catus*) occurs

⁽¹⁾ It is suspected that these may be dew-traps.

commonly in the bush and is an efficient predator on native fauna. It became feral in the early days of settlement and soon spread throughout the Colony. The naturalist Kearland while a member of the Calvert Scientific Exploring Expedition in 1896, recorded that 'in the desert of north-west Australia' he saw a tabby cat at least 400 miles [644 kilometres] from the nearest house. Earlier still the ornithologist Tom Carter writing in 1887 from the Carnarvon district spoke of 'the domestic cat, which is found quite wild and of a large size all through the colony'.

Examination of the composition of the older mammal fauna of Western Australia, *i.e.* monotremes, marsupials, bats and native rodents, as set out in the following table, reveals that only one-eighth of all species recorded from the State today appear to occur only in Western Australia. The south-west contains by far the greatest number of endemic species.

ENDEMISM OF NATIVE MAMMALS TO WESTERN AUSTRALIA
(excluding marine mammals)

Group	All endemic and non- endemic species	Number of endemic species			
		Total endemics	Endemics north of Fitzroy River	Endemics of South-West Land Division	Endemics of remainder of State
Monotremes	1	—	—	—	—
Native cats	23	5	1	2	2
Marsupial moles	1	—	—	—	—
Bandicoots	7	—	—	—	—
Possums	8	2	1	1	—
Wombats	1	—	—	—	—
Kangaroos and Wallabies	20	4	—	3	1
Rats	24	3	—	2	1
Bats	23	—	—	—	—
Dingoes	1	—	—	—	—
Total	109	14	2	8	4

Birds

The bird fauna of Western Australia consists of a selection of the species occurring in eastern Australia, with only a very minor development of endemic forms. All of these latter, except one (the Western Australian King Parrot, *Purpureicephalus spurius*), have a close and obvious affinity to other Australian forms. The quantitative relationship of the Western Australian bird fauna to that of Australia as a whole is indicated in the following table, which has been prepared on an ecological basis.

BIRD FAUNA

Description	Number of breeding species		Number of non-breeding visiting migratory species	
	Western Australia	Australia	Western Australia	Australia
Local birds	307	499	6	8
Inland water birds	51	52	33	42
Sea birds	25	38	33	55
Total	383	589	72	105

Representatives of most of the families and genera of Australian birds occur in this State. Notable absentees include the Cassowary (*Casuarus casuarinus*), Brush Turkey (*Alectura lathami*), several of the fruit-pigeons, the Crimson Rosella (*Platycercus elegans*), Lyre-bird (*Menura novaehollandiae*), several honeyeaters including the Regent (*Zanthomiza phrygia*), Apostle-bird (*Struthidea cinerea*), Cat-birds (*Ailuroedus*), Satin Bower-bird (*Ptilonorhynchus violaceus*) and Rifle-birds (*Ptiloris*).

Space is insufficient to detail all the forms occurring in Western Australia. Mention may be made only of some distinctive species and groups which are common and widely distributed.

The Emu (*Dromaius novaehollandiae*) is still numerous all over the State and is occasionally encountered in the Darling Range near Perth. Australia's only breeding species of penguin, the Fairy Penguin (*Eudyptula minor*), nests on islands off the southern and south-western coasts as far north as Carnac near Fremantle. The Mallee-fowl or Gnow (*Leipoa ocellata*) is still plentiful and, after a period of decline during which its disappearance was feared, it is now increasing in abundance. All of the widespread species of Australian quails occur but owing probably to the scarcity of natural grasses in the south are not individually very numerous. Among the pigeons two species have shown notable recoveries in population strength. After a long period of scarcity the Common Bronzewing (*Phaps chalcoptera*) began a cycle of increase about 1936 and is still very abundant. The rare Flock Pigeon (*Histriophaps histrionica*) of the more arid country of the north-west and the far north has declined all over Australia and had not been recorded in this State since 1927 until 1958 when considerable flocks were observed in the Hamersley Range and the Fortescue River country. It has also reappeared in parts of the Kimberley Division.

A very distinctive member of the rail family is the Black-tailed Native Hen or Gallinule (*Tribonyx ventralis*). It is a creature of the drier country but is subject to violent fluctuations in numbers, when it is liable to invade the south-west in great strength. A famous occasion was in May 1833 when it overran the settlers' fields and gardens around Perth and did considerable damage to the crops. Similar irruptions took place in 1853, 1886, 1897 and 1919. Later invasions, such as those in 1952 and 1964, have been on a much more modest scale. Of the three Australian grebes the most plentiful is the Hoary-headed Grebe (*Podiceps poliocephalus*) which assembles in the winter in big flocks on the southern estuaries, including that of the Swan River.

In the petrel group there are five breeding species in local waters. The most numerous is one of the mutton-birds, the Wedge-tailed Shearwater (*Puffinus pacificus*) which nests on most islands between Carnac in the south and Sable Island, in the Dampier Archipelago, in the north. A second mutton-bird, the Fleshy-footed Shearwater (*P. carneipes*) nests between Cape Leeuwin and the Archipelago of the Recherche; it is a migratory species and in the winter months migrates to the north-western sector of the Indian Ocean. A similar trans-equatorial migrant is the White-faced Storm-petrel (*Pelagodroma marina*), a diminutive form rarely observed at sea. It nests often in vast aggregations on islands off the south coast and as far north as the Abrolhos. All of these species nest in the spring and summer months. The remaining two breed in the winter. The Great-winged Petrel (*Pterodroma macroptera*) shares the nesting islands off the south coast with the Fleshy-footed Shearwater in a sort of 'Box and Cox' relationship. The black and white Little Shearwater (*Puffinus assimilis*) has a wider nesting range, from the Recherche to as far north as the Abrolhos; in former times it nested at Parrakeet Island off Rottnest Island. In the winter months some twenty-two species of southern-breeding petrels visit local seas. They vary in size from the little Wilson Storm-petrel (*Oceanites oceanicus*), barely larger than a swallow, to the great Wandering Albatross (*Diomedea exulans*). The Wilson Storm-petrel 'winters' all along the Western Australian coast to the tropics and is a familiar sight around fishing boats in Shark Bay. The most common of the albatrosses is the Yellow-nosed Albatross (*Diomedea chlororhynchos*) and may be seen as far north as Point Cloates. The most familiar of these visitors is the dusky Giant Petrel (*Macronectes giganteus*). Ringing experiments have demonstrated that the birds seen here are first-year individuals making circumpolar flights round the Southern Hemisphere; marked birds found in the south-west had been ringed a few months previously in their nests at Heard Island, Macquarie Island, and islands in the South Orkneys in the South Atlantic.

All of the five species of Australian cormorants or shags occur locally. Despite complaints of their depredations on commercially important fish, investigations have cleared the birds of blame, though one species, the Black Cormorant (*Phalacrocorax carbo*), specifically identical

with the Cormorant of Europe, does occasionally include edible fish in its diet. One marine species, the Pied Cormorant (*P. varius*), which enters the Swan River estuary and Peel Inlet, is mainly responsible for the guano deposits on the coastal islands. Deposits at Shark Bay were commercially exploited in the last century and at one stage, in 1850, a detachment of troops was stationed at The Quoin Bluff, Dirk Hartog Island, to ensure the collection of royalties. Pelicans in Western Australia, unlike those in eastern Australia, breed only on coastal islands and not on inland waters. Until recently the nearest breeding place to Perth, and presumably the origin of most of the Swan River Pelicans, was Pelican Island, Shark Bay. However, since 1962 a breeding colony has become established at Peel Inlet, Mandurah.

Fourteen species of terns are recorded for the southern parts of the State and three more for the Kimberley Division. Three of the seventeen are migrants from the Northern Hemisphere and ringed individuals of the European Common Tern (*Sterna hirundo*) and the Arctic Tern (*S. macrura*), marked in northern Europe, have been recovered near Fremantle. These birds must have reached our coast via the Cape of Good Hope. The Silver Gull (*Larus novaehollandiae*) is noteworthy for having two breeding seasons in the southern part of the State. On the islands at Safety Bay, for example, there is an egg-laying peak in the autumn and another in the spring.

The numerous Order of wading or shore-birds (sandpipers, dotterels, and plovers) includes a few locally-breeding species but the majority are migrants from the Northern Hemisphere, where they breed in the tundra zone of northern Asia. Though they frequent ocean beaches and estuaries, as well as swamps and lakes, they are listed in the category of 'inland water birds' in the table at the beginning of this section. Some twenty-five species of these birds, commonly called 'snipe' (though the true Snipe of eastern Australia, *Gallinago hardwickii*, does not occur in this State) migrate to Western Australia. In addition there are sixteen species of this Order which breed in Australia. One of them, the Red-capped Dotterel (*Charadrius alexandrinus*), is virtually identical with the rare Kentish Plover of England. Here it is very common and nests at Pelican Point on the Swan River. Another local breeder is the remarkable Banded Stilt or Rottneest Snipe (*Cladorhynchus leucocephalus*) which is an attractive inhabitant of the salt lakes of Rottneest Island. However, it nests only on the inland salt lakes. The nesting habits remained long unknown until colonies were discovered at Lake Grace and Lake King in 1930.

The Australian Bustard ('Wild Turkey', *Eupodotis australis*) is a magnificent bird which has been largely exterminated by shooters over much of south-eastern Australia and in the developed south-west of this State. It is not uncommon in sparsely-settled areas and individuals occasionally appear on the open coastal country quite near Perth. It has recently been demonstrated by ringing that the Straw-necked Ibis (*Threskionis spinicollis*) ranges between south-western Australia and northern and eastern Australia. Fledglings marked in the nests at Muchea have later been taken in the North-West, the Kimberley Division, Arnhem Land and near Orange (New South Wales).

The Brolga (*Grus rubicunda*) is a northern bird normally found as far south as Onslow, but some individuals may wander into the outer parts of the south-west as occurred in 1952. In the heron family a new bird has been added to the State list — the Cattle Egret (*Bubulcus ibis*), which appears to have colonised northern Australia from Indonesia and has now spread over much of eastern and Western Australia.

There are eighteen species of swans and ducks occurring in the State, one of the most remarkable, perhaps, being the Cape Barren Goose, which is now restricted to the islands of the Archipelago of the Recherche. Recent leg-ringing experiments have shown that the common and widespread Grey Teal (*Anas gibberifrons*) wanders indiscriminately all over Australia, its movements being influenced by availability of surface waters.

Though the Black Swan (*Cygnus atratus*) occurs all over Australia, and in fact is more plentiful in some of the other States, historical reasons give it a peculiar association with Western

Australia. The bird was first recorded by Europeans in this State, by Antonie Caen, skipper of the Dutch ship 'Banda' in July 1636 off the north-west coast. The first specimens were captured on the Swan River by Willem de Vlaming in January 1697 and taken alive to Batavia, whence they astonished the scientific world. Vlaming named the river after them, and the first colonisation in 1829 was known as the Swan River Settlement. The bird became the emblem of the Colony and State, with the motto, *Cygnus insignis*. The birds do not, and probably never did, occur in the broadwaters of the Swan River estuary, but in the shallows at Lucky Bay and above Heirisson Island. During the 1890s the authorities imported birds from elsewhere in the State, and even from Victoria, and set them free, pinioned, in Perth Water, where they were an attraction in Mounts Bay when the old men's home was located near there.

The State is also well provided with hawks and eagles, twenty-four species being found within its limits. Most are harmless economically and the few that do take chickens and lambs are not serious depredators, though there is controversy on the role of the Wedge-tailed Eagle (*Aquila audax*) which is, however, classified by the Agriculture Protection Board as vermin in certain districts in the central and north-west portions of the State.

There are not as many species of the parrot group in Western Australia as there are in eastern Australia but one species, the Western Australian King Parrot or Red-capped Parrot (*Purpureicephalus spurius*), is restricted to the south-west and has no near relatives elsewhere. The Twentyeight Parrot is a form of the Port Lincoln Parrot (*Barnardius zonarius*) and is common almost everywhere, being regularly present in Kings Park, a natural reserve adjacent to the City of Perth.

The Kookaburra (*Dacelo gigas*), so common in the forests of the south-west, is not a Western Australian native but was introduced from eastern Australia by the Acclimatisation Board during January 1897. A similar species, however, the Blue-winged Kookaburra (*D. leachii*) occurs in the north, as far south as the Wooramel River. The Rainbow-bird (*Merops ornatus*) in the south is a strict migrant, arriving regularly in the first week in October. Local birds migrate to the north of the State, the wintering area being from the Gascoyne River northward, but some individuals cross the Timor Sea to the Indonesian islands. There are eleven cuckoo species in our area, the commonest being the Pallid Cuckoo (*Cuculus pallidus*) whose plaintive insistent note is heard soon after the winter rains set in.

In the great group of passerines, or song-birds (Order Passeriformes), the most celebrated is the Noisy Scrub-bird (*Atrichornis clamosus*), a primitive almost-flightless bird which until recently was believed to be the only Australian bird which had become extinct since white settlement. The last specimen was collected by the ornithologist A. J. Campbell at Torbay in 1889, but late in 1961 a surviving population was discovered at Two Peoples Bay east of Albany. Space is insufficient to deal in any detail with other members of this large Order. Throughout the State there are 172 species, of which 95 occur in the southern settled parts and at least 33 are found in Kings Park. A distinctive robin, the White-breasted Robin (*Eopsaltria georgiana*), occurs in the south-west. It is a relative of the yellow robins and is found in the dense coastal and forest thickets from Geraldton southward and east to Albany and the Porongurups. The Western Warbler (*Gerygone fusca*) is a sweet-voiced songster which may be heard in the street trees of Perth, the only Australian capital city in which it lives; in the other States the bird is an inland species. Another distinction of the Perth metropolitan area is that four species of blue-wren, a greater number of species than in the environs of any other capital city, have been noted there. One species, the Red-winged Wren (*Malurus elegans*), which used to live near the city, disappeared when Herdsman Lake was drained. The remaining species are the Splendid Wren (*Malurus splendens*), occasionally still seen in the University grounds; the Blue-and-white Wren (*Malurus leuconotus*) in the coastal dune scrubs, and the Causeway and Pelican Point samphire flats; and the Variegated Wren (*Malurus lamberti*) in the dune thickets. Honeyeaters are numerous, the largest, the Red Wattle-bird (*Anthochaera carunculata*), being a familiar bird in metropolitan streets and gardens. Most of the grassfinches

are restricted to the Kimberley Division, where ten species are found. However, one of them, the widespread Zebra Finch (*Taeniopygia castanotis*), nests as near to Perth as Northam and York. Two bower-birds occur in the State. The Great Bower-bird (*Chlamydera nuchalis*) is confined to the Kimberley Division, but the Spotted Bower-bird (*C. maculata*) is found in the north-west and ranges south to the East Murchison country and Malcolm in the Eastern Goldfields.

In contrast with all other Australian States there are very few species of exotic birds established in Western Australia. (The same is true of the Northern Territory.) In the towns of the south-west two turtledoves are plentiful, the Indian (*Streptopelia chinensis*) and the Senegal (*S. senegalensis*). The Goldfinch (*Carduelis carduelis*), an escapee from aviaries, breeds freely in the Perth metropolitan area and around Albany. Recently another cage-bird escapee, the Red-browed Finch (*Aegintha temporalis*), an eastern Australian species, has established itself east of Kalamunda in the Darling Range near Perth. The Indian or Ceylon Crow (*Corvus splendens*) repeatedly arrives at Fremantle on ships from the Orient but the vigilance of officers of the Department of Agriculture and port officials has led to the successful eradication of the unwanted immigrants. The House Sparrow (*Passer domesticus*) has been similarly kept at bay at Fremantle. This species did, however, make a temporary colonisation, from South Australia, in the vicinity of Eucla and Mundrabilla in 1917-18 but it failed to make any headway and disappeared from there.

Reptiles

In Western Australia the reptiles are represented by three major zoological groups or Orders. These are the Chelonia (four marine species of turtles and six of freshwater tortoises). Crocodilia (two of crocodiles) and the Squamata (sixty-two species of snakes and 159 of lizards).

The freshwater tortoises of Western Australia, like those of the rest of the continent, belong to the ancient group of side-necked tortoises. In most other parts of the world tortoises retract their heads straight backwards bending their necks in a vertical S-shaped curve. Australian tortoises, and certain others from South America, bend their necks sideways; this is believed to be an ancient character. Although the species of Western Australian tortoises are few, they are of great interest and their distributions are far from well understood. This is especially true of the species inhabiting the Kimberley. Freshwater tortoises do not seem to fall into simple faunal zone classifications. The common long-necked tortoise of the south-west, *Chelodina oblonga*, is closely related to the long-necked tortoise of the Kimberley Division, *Chelodina rugosa*. However, neither of the short-necked tortoises of the Kimberley Division, *Emydura australis* and *Elseya dentata*, is represented in the south-west. The river systems from the Irwin, in the Northern Agricultural Division to the De Grey in the northern Pilbara, have their own tortoise (*Chelodina steindachneri*), while a highly specialised short-necked tortoise (*Pseudemydura umbrina*) is apparently confined to a few square kilometres of winter swamps between Upper Swan and Bullsbrook to the north of Perth. Because of its vulnerability to extinction this last species is rigidly protected.

Marine chelonians also occur in large numbers around the coasts. The Green Turtle (*Chelonia mydas*), the species which is used for soup making, comes ashore to lay its eggs on the northern beaches. Attempts have been made in the past to exploit this species commercially but it is now protected. However, a non-profit organisation has been granted a licence on behalf of a group of Aborigines in the Kimberley region to take a specified number of eggs and day-old hatchlings. These will be raised by the Aborigines at a commercial turtle farm at One Arm Point, north of Broome. A certain proportion will be liberated so that the wild stock will not be depleted.

Snakes and lizards are common and widespread throughout the State, and in numbers of obvious individuals they are probably surpassed among the vertebrates only by the birds. In

the south-west, Bobtails (*Trachysaurus rugosus*) can often be seen crossing the roads at most times of the year, while the walker among coastal sand dunes on warm days cannot avoid noticing innumerable small dragon-lizards which move away from in front of him. In the southern part of the State the largest lizard which is at all common is the Goanna (*Varanus gouldi*). These are frequently between 0.9 and 1.2 metres in length. In northern areas the Perentie (*Varanus giganteus*) exceeds it in size. A few species are confined to the south-west and of these the most interesting are Mueller's Snake (*Rhinoplocephalus bicolor*), the Little Brown Snake (*Elapognathus minor*), the Black-Striped Snake (*Vermicella calonota*) and the Slender Snake Lizard (*Pletholax gracilis*) which is also one of our rarest species of lizard. An Eyrean species which never ceases to surprise the visitor is the terrible-looking Mountain Devil (*Moloch horridus*). This lizard is actually one of the most gentle and harmless of animals and lives exclusively on ants.

The snake fauna of the State is diverse and, like that of other parts of Australia, contains many venomous species, the best known being the Tiger Snake (*Notechis scutatus*), the Dugite (*Demansia affinis*), the Gwardar (*D. nuchalis*), the Death Adders (*Acanthophis antarcticus* and *A. pyrrhus*) and the Mulga Snake (*Pseudechis australis*).

The snakes and lizards are well described in Glauert's *Handbook of the Snakes of Western Australia* and *Handbook of the Lizards of Western Australia* (see bibliography at the end of this Part).

Because of the great distance of the Kimberley Division from centres of scientific research, insufficient is known of its snakes and lizards. As in the case of some of the smaller mammals, some endemic species of lizards have been described, but until much more scientific collecting and research has been done it will not be possible to evaluate such apparently-unique species. Some Kimberley species of lizard, e.g. the Frilled Lizard (*Chlamydosaurus kingi*), through being commonly illustrated in journals because of their bizarre appearance, have become familiar to the public.

Amphibia⁽⁴⁾

Unlike the other continents Australia has no newts or salamanders (Urodela) or worm-like gymnophionans (Apoda). However, frogs (Anura) are abundant.

The frogs of Western Australia fall into the same grouping (Bassian, Eyrean and Torresian) which was mentioned in the section on mammals. However, they lack the diversity of genera and species shown by other groups and only ten genera with about thirty species are known from south of the Tropic of Capricorn. Of these, two genera, *Metacrinia* and *Myobatrachus*, each with one species, are restricted to the south-west. Most of the other kinds of frogs are distinct from, but related to species found elsewhere in Australia.

Since most of Western Australia is exceedingly dry it is of interest to note that frogs are common in these arid regions. Those species of *Heleioporus* which occupy marginal desert habitats overcome drought conditions by burrowing into the damp sub-soil. However, the arid-country species of *Neobatrachus* frequent clay soil where deep burrows are impossible and water can be lost. These species show no special capacity to endure greater water loss than *Heleioporus* species, but they do display an exceptional capacity for rapid replacement of water when water is present, as for example after thunderstorms. The water-holding frog, *Cyclorana platycephalus*, is found in inland and northern parts of the State. All 'desert' species retain an aquatic larval life, but this is much shorter than that of species in the well-watered parts of the State. The only species lacking aquatic larval development occur in the wetter south-west; these are *Myobatrachus gouldii*, *Metacrinia nicholli* and *Crinia rosea*. *Myobatrachus gouldii* is the only species which exhibits any strong dietary preference and eats only termites (Isoptera).

⁽⁴⁾ Written in collaboration with Prof. A. R. Main.

Freshwater Fishes⁽⁵⁾

The truly freshwater fish fauna of the southern part of the State is, by eastern Australian standards, an impoverished one and the species, with the exception of the freshwater catfish ('cobbler'), are diminutive in size. Most of the species are representatives of eastern Australian genera, such as the Pigmy Perch (*Edelia vittata*), Mountain Trout (*Galaxias truttaceus*), the Native Minnow (*G. occidentalis*) and Black-striped Minnow (*Galaxiella nigrostriata*). Others are more distinctive, with no near relative in eastern Australia, such as the Nightfish (*Bostockia porosa*), the King River Perchlet (*Nannatherina balstoni*) and the Salamander Fish (*Lepidogalaxias salamandroides*). There are several gobies (*Favonigobius suppositus* and *Pseudogobius olorum*) and hardyheads (including *Atherinosoma presbyteroides*, *A. elongata* and *Craterocephalus cuneiceps*). A lamprey (*Geotria australis*) ascends the rivers to breed and has been recorded north to the Moore River, but is more abundant in the streams emptying on the south coast. An eel (*Anguilla australis*) has been recorded from the south-west but it is not known whether it is native to the area or has been introduced.

The north-western rivers have a richer fish fauna. The most widespread species is the Spangled Perch (*Leiopotherapon unicolor*), a useful food fish which occurs in all rivers south to the Murchison. A large catfish (*Arius australis*) reaching 2.3 kg in weight, occurs in the systems south to the Fortescue. The Rainbow Fish (*Melanotaenia australis*), popular with aquarists occurs in the river systems of the Pilbara and the Kimberley. The remarkable Blind Gudgeon (*Milyeringa veritas*) and blind eel (*Anommatophasma candidum*) occur in wells and subterranean channels in the North West Cape area. The Kimberley Division has an even larger series of freshwater fishes. These include a catfish (*Tandanus unicolor*), various Bony Bream (*Nematolosa erebi*), various perch-like fishes (family Teraponidae), Gudgeons (*Hypseleotris*) and two freshwater saw-fishes (*Pristis clavata* and *Pristiopsis leichhardtii*). There is also a freshwater eel (*Anguilla bicolor*) in these far northern waters.

Marine Fishes⁽⁶⁾

The marine fish fauna of Western Australia is probably richer in species than that of any other Australian State. This is because the fishes of the northern part of the State's very long coastline belong to the rich tropical Indo-Pacific fauna, while its southern fauna is a temperate one which includes many elements peculiar to Australian waters. The most up-to-date list of the species of Western Australian fishes, published in 1948, enumerates 740 species, but since that time collecting has revealed about 700 more. Even so, this figure is still far short of the total number which, it is suspected, will eventually be found to be in the neighbourhood of 2,000.

From this it can be seen that there is much to be learnt about fishes of Western Australia but it is probable that only a few of these species are confined to Western Australian waters. At present it seems that most of the fish occurring in the tropical part of the State are widely distributed, and species often range throughout the whole of the tropical Indian and Pacific Oceans, while the species which are found along the south coast usually occur also in the waters of South Australia, Victoria, Tasmania and southern New South Wales.

Between Cape Leeuwin and Shark Bay both northern and southern elements are found, the tropical element dominating as far south as the Houtman Abrolhos.

In addition to the widely-distributed tropical and southern elements, there are a number of species, between thirty and forty, which seem to be peculiar to Western Australia. It is necessary to be cautious here for two reasons. Firstly, because the Indo-Pacific fish fauna is, as a whole, poorly known and some fishes, at present only recorded from Western Australia, may actually have wider ranges. Secondly, our classification of fishes is still imperfect so that fishes which we regard as endemic to Western Australia may be known from some other region, but under different names. On the other hand there can be no doubt that at least a proportion of

⁽⁵⁾ Revised by J. B. Hutchins. ⁽⁶⁾ Contributed by Dr G. F. Mees.

these species which we now believe to be endemic will prove to be confined to Western Australian waters.

In the following very incomplete review, a number of the more important and interesting families and species are listed.

Of the major groups, the Elasmobranchii (sharks and rays) are richly represented, with nearly eighty species, of which the most familiar are the Port Jackson Shark (*Heterodontus portusjacksoni*), the Carpet Shark or Wobbegong (*Orectolobus maculatus*) and the shark known locally as the Swan River Whaler (*Carcharhinus leucas*), which can be caught in the Swan River as far upstream as the Garratt Road Bridge. It occurs during the summer months and one non-fatal attack in the Swan River has been attributed to this species. The Port Jackson Shark and the Carpet Shark are regarded as harmless to man; of the dangerous species, the Tiger, the Whaler and the White Pointer are perhaps the best known. Four fatalities from shark attack have been recorded for Western Australia (in 1803, 1923, 1925 and 1967) and a few people are known to have been maimed. It may be said, however, that in Western Australia the danger of shark attack is low.

Most major families of bony fishes are represented, but only a number of the more interesting of familiar species can be mentioned here.

There are about ten species of true herring (Clupeidae), one of which, the Pilchard (*Sardinops neopilchardus*) will in future probably become of economic importance. The rather similar-looking *Amblygaster postera* seems to be confined to Western Australia. The State is particularly rich in sea-horses and pipe fishes, there being some thirty-eight species. The most familiar of these is perhaps the leafy sea-horse (*Phyllopteryx foliatus*) which is often found on the beaches after storms. The so-called Sand Shark or Rat Fish (*Gonohynchus greyi*), a peculiar fish and the sole representative of its family, deserves mention; it is fairly common off sandy coasts of the south-west. Though eels are represented by several families and over twenty species, only three are common in the south-west; the Snake Eel (*Ophisurus serpens*), a slender golden brown eel inhabiting sandy estuaries, which is often taken for a snake and referred to as the water snake; Woodward's Eel (*Gymnothorax woodwardi*), found on rocky shores, yellowish green with a network of grey lines; and the Conger Eel (*Conger wilsoni*), which normally is grey in colour.

Garfishes (Hemiramphidae) are common. Of their relatives the Long Toms (Belonidae), only *Belone ciconia* is common in the south-west, the others being more tropical in distribution, though one of the northern species, *Belone hians*, has been found as far south as Rottnest Island.

Silversides and hardyheads (Atherinidae) are well represented and so are mullets (Mugilidae). Some representatives of these groups have been mentioned in the preceding section, which deals with freshwater fishes.

The family Serranidae, known as groper, rock cod, etc. are represented by nearly thirty species. The best known is the North-west Groper (*Epinephelus tauvina*) which attains a length of more than two metres. Most species have a very wide, mainly tropical distribution, but *Epinephelus rankini* is only known from a restricted area round Onslow and must be looked upon as endemic to Western Australia. In temperate waters the preceding family is more or less replaced by the related Hypoptectrodidae.

Some small families, like the Australian Salmon (Arripidae), Whiting (Sillaginidae) and Snappers (Sparidae) are of great economic importance, though there are only a few species. On the other hand the Skipjacks (Carangidae) are one of the largest families of the State and comprise some thirty species. Another group which are also called Snappers (Lutjanidae) is prominent in the tropical part of the State. These are often referred to as North-west Snappers and should not be confused with the southern Snapper (*Chrysophrys unicolor*) which belongs to the Sparidae.

Coral fishes (Chaetodontidae) are richly represented, mainly along reefs in the tropics, but a number of species come down to the Houtman Abrolhos, and some even near to Perth. Most species have a very wide distribution in the Indo-Pacific, but one, *Chaetodon assarius*, has not been found outside Western Australia.

The Mackerel family (Scombridae), which includes mackerel, Spanish mackerel, tuna, bonito and albacore, is important both in tropical and temperate waters. The related marlins and swordfishes, well known to sporting fishermen, also occur in these waters.

Flatfishes (Heterosomata) occur in a great variety of species, and the same can be said of Parrotfishes and Wrasses (Scaridae and Labridae). All these groups are as yet very insufficiently known.

The stargazers and stonelifters are sluggish bottom fishes that deserve mention because of their unusual shape. One, *Ichthyscopus barbatus*, occurs off the south-west coast and also in South Australia, and is regularly caught by anglers. Another species, *Ichthyscopus insperatus*, a common fish of the north-west coast from Broome to Shark Bay, seems to be confined to Western Australia. The dragonets (Callionymidae), of which nine species have been recorded, are smaller, but their pretty appearance attracts attention, and one species, *Dactylopus dactylopus*, widely distributed in the Indo-Pacific, is regularly found off sandy beaches as far south as Rockingham.

Blennies (Blenniidae), weedfish (Clinidae), and gobies (Gobiidae) are small fishes of which there are many species; blennies are most plentiful in rockpools and on reefs in the tropics, while gobies are also found on sandy bottoms.

There are some forty species of scorpion fishes known from the State, the most familiar of which are *Scorpaena sumptuosa* in the south, and the small *Scorpaena bynoensis* in the north; the first-mentioned species is also interesting in that, though it has been known for almost a century, it has never been recorded from outside Western Australia. Of the closely-related Synancejidae, the feared stone fish, three species are known from the State, one of which, *Erosa daruma*, is apparently restricted to the north-west and is known from but two specimens. A related species occurs in Queensland and Japan.

Flatheads (Platycephalidae) are common in the temperate part of the State.

An interesting family is that of the angler fishes or toad fishes (Antennariidae). Their curious shape with the leg-like pectoral fins always excites attention. There are about a dozen species, two of which are endemic to the State. One of these is *Echinophryne glauerti* which is occasionally found washed up on City Beach.

Leatherjackets (Monacanthidae) are a large group distinguished by the rough leathery skin and a single large erectile spine on the nape. Some species, like *Chaetoderma penicilligera*, are common and of attractive appearance.

Of the blowfish family, the common Blowie (*Tetraodon [Spheroides] pleurogramma*) needs special mention; it is extremely plentiful off the coast at Fremantle and in the Swan River estuary. It is poisonous to eat and is greatly disliked by anglers who find that it greedily takes their bait. Fishes of this family contain a poisonous substance called tetraodontoxin and the celebrated navigator Captain James Cook was very ill after eating a blowfish in the course of a voyage in the Pacific in 1774. Boxfishes (Ostraciontidae) and porcupine fishes (Diodontidae) are related groups, each represented by a number of species.

Further information about the commercial fishes in Western Australian waters is given in the Fisheries section of Chapter VIII, Part I — *Agriculture, Forestry and Fishing* where the principal species of edible fish are listed together with the quantities of each species caught. The section also contains additional information relating to whaling (see *Mammals* earlier in this Part).

THE INVERTEBRATE FAUNA (7)

The invertebrate fauna of Western Australia is large and varied, as one would expect in a third of a continent which extends from temperate to tropical zones and includes both coastal and desert

(7) Written with assistance from Drs R. W. George, E. P. Hodgkin, L. E. Koch, Barbara Y. Main and B. R. Wilson, Mr G. W. Kendrick and Mrs L. M. Marsh.

areas. Rather than spread our descriptions too thinly over this enormous field we have restricted ourselves to a brief summary of the position in relation to a few selected groups in which work is being actively carried out.

Several invertebrate species are commercially exploited here, the most important being the Western Rock Lobster (*Panulirus cygnus*) which supports an extensive export fishery. Others commercially important include several species of octopus, cuttlefish and squid, the Blue Swimming Crab ('Blue Manna', *Portunus pelagicus*), several species of prawns, two species of scallops (*Amusium balloti* and *Pecten modestus*), and three species of abalone. Pearl-shell was fairly extensively fished along the north-west coast but this fishery has now declined, the smaller quantity of pearl-shell now taken being used in the developing pearl-culture industry.

A summary of the terrestrial and freshwater invertebrate fauna and their ecology is given in Main's *Guide for Naturalists* (1968).

Echinodermata

All five groups of echinoderms, feather stars (Crinoidea), star fish (Asteroidea), brittle stars (Ophiuroidea), sea urchins (Echinoidea) and sea cucumbers (Holothurioidea) are well represented in the rich echinoderm fauna of the continental shelf and shore waters of Western Australia.

The majority are either tropical species or endemic species with tropical affinities.

A recent assessment of the starfish has shown that of the 114 described species nearly half are either widely distributed Indo-Pacific species or are found in the East Indian region while less than 20 per cent are southern Australian species and nearly 40 per cent are found only in Western Australia.

The only starfish likely to be of economic importance in Western Australia is *Acanthaster planci*, the crown-of-thorns, which feeds on living corals and has caused extensive damage to coral reefs in the Indo-Pacific region when in plague numbers. This species is found in Western Australia from the Kimberley coast to the North West Cape area. A fairly large population in the Dampier Archipelago, monitored by the Western Australian Museum between 1972 and 1974, was found to aggregate seasonally in shallow water but did not cause significant damage to the coral reefs.

Certain edible species of holothurians known as *beche-de-mer* or *trepang* occur on the shores and reefs of north-western Australia. Little is known of the fishing potential for trepang on the offshore reefs but the resource has been traditionally fished by boats from Indonesia.

Mollusca

The molluscan fauna of the Western Australian coastline has not been recently catalogued, but from the area within fifty-six kilometres of Fremantle 270 species of bivalves (Pelecypoda), and univalves (Gastropoda) are recorded. The smaller groups, chitons (Amphineura), octopus and cuttlefish (Cephalopoda) and tusk shells (Scaphopoda) are also represented.

Molluscs dominate the intertidal rocks of the west coast, especially chitons, periwinkles, and limpets; the limpets range from the very large *Patellanax laticostata* to the small *Notoacmea onychitis*. On the north-western coast, rock oysters (*Saccostrea* spp.) and barnacles are dominant intertidally. The oysters are fished for food on a small scale in places where extensive beds are uncovered at low tide.

Bivalves occur mainly on sandy and muddy bottoms such as those of Cockburn Sound and King George Sound, and along the north-western coast. They are less plentiful on the unstable sandy shores of the open western coast. The Golden-lipped Pearl-shell (*Pinctada maxima*) is the basis of the flourishing pearl-culture industry in the north of the State. This species is favoured because of the quality of the pearls produced and because of the speed with which the nacre or mother-of-pearl is laid down on the 'seeds'. Using techniques developed by the Japanese these seeds are inserted into the pearl-shell's flesh to produce spherical pearls, or between the flesh and the shell to produce half-pearls. The small pearl-shell which is so abundant in Shark Bay

belongs to the species *Pinctada albina* which is widely distributed in the Indian and Pacific Oceans. It was formerly gathered for the natural pearls which, though small, are of a fine colour and texture.

An abalone fishery has been established in temperate waters. On the lower west coast the small Roe's or Western Black-lip abalone (*Haliotis roei*) is gathered. Along the southern coast east of Cape Leeuwin the larger Green-lip (*Haliotis laevigata*) and the Brown-lip abalone (*Haliotis conicopora*) are taken.

Many species of cowrie shells occur on the rocky shores of the north-west coast while a few species such as *Cypraea* (*Zoila*) *friendii* and *Cypraea* (*Austrocypraea*) *reevei* are confined to the south-western corner of the State. The north-west coast also has many endemic species of volute shells such as *Volutoconus hargreavesi*, *Amoria macandrewi* and *Amoria praepecta*.

Of the gastropods without visible shells two species are conspicuous in the fauna of the Fremantle area. One is the large sea-hare (*Aplysia gigantea*) with a small internal shell; it may be cast up on the beaches in large numbers after winter storms. The other is a nudibranch, with no shell at all, the colourful *Glossodoris westraliensis*, well known to visitors to Rottnest Island.

The non-marine molluscan fauna (terrestrial and aquatic) is not diverse. Conspicuous in the south-west are species of the pulmonate genus *Bothriembryon*, which are adapted to a wide variety of habitats from cool temperate rain forest to arid steppe. In the Kimberley, north-west, and arid regions generally the snail family Camaenidae predominates. Throughout the State there are also many other smaller and inconspicuous terrestrial snails and a small number of aquatic snails and bivalves.

Corals

Coral reefs are well developed in a number of places on the shores and continental shelf of Western Australia (Fairbridge, 1950). Patch and platform reefs are numerous on the inner part of the Sahul and North West Shelves while on the outer parts of these shelves is a series of great atolls, Scott and Seringapatam Reefs and the Rowley Shoals, the fauna of which is poorly known. There are fringing reefs along the shores of the mainland and near-shore islands of the Kimberley and Pilbara coasts but coral growth is restricted due to turbidity caused by the outflow of rivers, muddy shoreline (in parts) and the large tidal range. However, some coral genera such as *Trachyphyllia*, *Caustrea* and *Moseleya* appear to favour the turbid inshore waters while many others tolerate these conditions. In the Dampier Archipelago there is a rich coral fauna of more than forty-eight genera (Wilson and Marsh) found from the most turbid inshore waters to the relatively clear waters of the outer islands.

A part barrier, part fringing reef, the Ningaloo Reef Tract, extends for 145 kilometres southwards from North West Cape. It lies up to five kilometres off the coast with deep water off its outer edge and a shallow lagoon inshore. The barrier reef is broken by a number of passages along the sides of which the most diverse and luxuriant coral growth is found while in places there are dense thickets of staghorn corals (*Acropora* spp.) in the lagoon. Forty-four genera and about 170 species of reef-building corals, including the non-scleractinian blue coral *Heliopora* and the fire coral *Millepora* occur on these reefs.

The most southerly true coral reefs in the Indian Ocean are found at the Houtman Abrolhos which lie near the edge of the continental shelf off Geraldton in latitude 28-29°S. *Acropora*, one of the most important reef builders, flourishes at the Abrolhos, where the minimum sea temperature seldom falls below 19°C, but does not occur further south except in Pleistocene fossil beds at Rottnest Island.

The great diversity of habitat in the Abrolhos reefs, from extreme shelter of the 'blue holes' in the inner reefs to extreme exposure on the seaward reefs, provides conditions for several genera not found on more northerly reefs making the Abrolhos an exceptionally rich coral area for its latitude. The generic diversity at the Abrolhos is nearly as high as in the North West Cape area although there is a general reduction in the number of species recorded.

The coral fauna diminishes sharply south of the Abrolhos but a number of species extend their range into the south-west of the State, sometimes forming extensive colonies but never true reefs. At Rottnest Island *Pocillopora damicornis* and *Montipora* make striking pink and violet patches in shallow water while *Pocillopora* covers a shallow reef at Parker Point. Twelve genera of reef corals are found in the Fremantle area including Rottnest Island and Cockburn Sound where corals are well developed despite minimum water temperatures sometimes falling below 14°C.

Further south seven genera reach Geographe Bay where *Turbinaria* forms large colonies, and three genera extend along the south coast to the Recherche Archipelago.

Crustacea

The most important commercial species of crustacean in Western Australian marine waters is the Western Rock Lobster, *Panulirus cygnus*. It occurs from North West Cape in the north to Hamelin Bay in the south. In the tropics five additional species of *Panulirus* occur; these are collectively referred to as 'Tropical Rock Lobsters' (*Panulirus versicolor*, *P. ornatus*, *P. homarus*, *P. penicillatus* and *P. polyphagus*). On the southern coast occurs *Jasus novaehollandiae*, (Southern Rock Lobster) which is the commercial species of rock lobster in south-eastern Australia, but it is not of economic importance in this State.

Two species of Shovel-nosed Lobsters are sometimes taken in prawn trawls. *Thenus orientalis*, the Moreton Bay Bug, occurs in Exmouth Gulf and further north. *Ibacus peronii*, the Balmain Bug, lives in sandy silt along our south coast. Both species are good eating. Offshore beyond the 180-metre depth limit of the Western Rock Lobster, lives a large spiny crab *Hypothalassia armata* which may develop into a commercial proposition.

The Swan River Prawn or School Prawn (*Metapenaeus dalli*) is taken by amateur and professional fishermen in the west coast estuaries by small hand-hauled nets. In the northern gulfs and bays larger prawns of the genus *Penaeus* and *Metapenaeus* are sought by large commercial prawn trawls for export. The present main centres are at Shark Bay, Exmouth Gulf and Nickol Bay and exploration of waters around the Kimberley Region is continuing. The main species are the Western King Prawn (*P. latisulcatus*), the Brown Tiger Prawn (*P. esculentus*) and the Banana Prawn (*P. merguensis*).

The Blue Swimming Crab (*Portunus pelagicus*), plentiful in the summer in the estuaries of the Swan River and at Mandurah, is one of the common commercial crabs of Australia.

Two common species of crab are the Rock Crab (*Leptograpsus variegatus*) and the Ghost Crab (*Ocypode convexa*). The Rock Crab scrambles among rocks and jetty piles of the west and south coasts, whereas the Ghost Crab digs spiral burrows at the edge of the beach and is endemic to the west coast.

Of the many other species of non-commercial crustaceans some groups have been recently monographed by scientific workers. These are the swimming crabs, mantis shrimps, pebble crabs and ghost crabs.

Crustacea are also common in inland waters (see *Fauna of Inland Waters* at the beginning of this Part).

Spiders

Like most other invertebrate groups, the spiders are represented by a large number of genera and species and it is not possible at this stage to give an accurate picture of the relationships of the Western Australian fauna to the rest of Australia. Early work on the Western Australian spiders was restricted to the description and naming of species. Research now is centred on investigations of the biology of various species and the special adaptations of endemic forms to the particular conditions of the Western Australian environment. The most interesting of the spiders, when viewed from this aspect, are the burrowing groups, including primarily the Mygalomorphae ('trapdoor' spiders) and the Lycosidae (Wolf spiders). Some of

these forms show special adaptations to semi-arid environments, to reduced food supply, and to flash-flooding, such adaptations being paralleled in many taxonomically unrelated genera. It is also of interest that some families, which in other parts of the world and in the wet forests of Australia are primarily web weavers and litter dwellers, are burrowers in the arid parts of Western Australia (and also in other dry parts of Australia). Such forms are essentially nocturnal and escape the unfavourable conditions of the day by remaining in their burrows and some species seal their burrows during the summer period.

Scorpions

The large brown scorpions, belonging to the genus *Urodacus*, are common in Western Australia where they live under small rocks and in deep spiral burrows in more arid places. Other scorpion genera (e.g. *Lychas*, *Cercophonius*) are small and variegated and live under the bark of trees and logs and amongst stones and litter. All these scorpions are nocturnal and sometimes sting humans.

Insects

The more important insect species occurring in Western Australia (particularly those of economic significance) are dealt with in Part 5 of this Chapter.

EXTINCT FAUNA AND FLORA ⁽⁸⁾

Current work by the University of Western Australia on barytes deposits from North Pole Mine, sixty kilometres north-west of Marble Bar, has demonstrated the existence of stromatolites, algal accumulations, in rocks believed to be almost 3,500 million years old. Their existence has caused extreme interest among geologists throughout the world as they provide a direct link from the present to the earliest signs of life on earth. Throughout the rest of the Precambrian, up to 550 million years ago, stromatolites occur sporadically through the sequence. At Hamelin Pool, Shark Bay, stromatolites are still in existence.

The explosion in development of marine life forms at the beginning of the Cambrian Period is demonstrated in the far north-eastern part of the State, trilobites and brachiopods occurring in rocks of that age in the Ord River region. The following Ordovician Period was dominated by deposition of shallow water sediments in the Canning Basin — 2,250 metres of rocks containing abundant early Ordovician nautiloids, trilobites and graptolites.

In the Silurian Period, which commenced nearly 450 million years ago, sedimentation was very restricted in Western Australia, affording little evidence of marine life. However, in the Murchison River district vast deltaic deposits, formed by what must have been a very large river system draining inland mountains now represented by their worn down roots, have preserved tracks of numerous animals. Most significant are the tracks of one metre long eurypterids, giant scorpion-like creatures. These tracks appear to be the most extensive found anywhere in the world.

The warm Devonian seas, in which grew magnificent reef complexes of the Canning Basin, in particular those exposed in Windjana Gorge, abounded in early fish. These primitive, armoured animals have been found silicified in nodules, from which, by immersion in acetic acid, the animals have been reconstructed to their original form. These fish are recognised as being among the best preserved of their kind in the world and have been the basis for important research into the early evolution of fish.

The 250-350 million year old Permo-Carboniferous rocks in the Canning and Carnarvon Basins form some of the most highly fossiliferous rocks of the State: brachiopods, crinoids, bivalves and ammonoids crowd the rocks at many horizons. The Triassic rocks of Western Australia, although occupying a small area contain, locally, abundant remains of large fossil amphibians, up to one metre in length. Few fossiliferous sedimentary rocks were deposited

⁽⁸⁾ Contributed by Dr K. J. McNamara, Curator of Palaeontology, Western Australian Museum.

during the Jurassic Period anywhere in Australia, but near Geraldton limestones contain bivalves, gastropods, ammonites and rare echinoids.

During the early Cretaceous, terrestrial sandstones were deposited near Broome and afford the only evidence of the existence of dinosaurs in Western Australia — footprints of a large theropod. The Cretaceous rocks of the State are more notable for the occurrence of a prolific ammonite fauna in marls in the Carnarvon Basin. These ammonites lived near the close of the Cretaceous Period at about 65 million years ago, and close to the period of extinction of this group of animals.

With the onset of the Palaeocene Period there was a drastic change in the nature of the marine fauna, the dominant fossils in the rocks in the Carnarvon Basin being echinoids and brachiopods. The Palaeocene to Eocene sediments contain fossils very similar to those of a similar age found in Madagascar and south-eastern Africa, whereas the Miocene and younger rocks contain a fauna which bears many similarities to the modern Western Australian fauna.

Little is known about animal life on the land during the Tertiary. However, during the Pleistocene Period, from about two million years to 10,000 years ago, there is fossil evidence of the existence of giant marsupials, including the rhinoceros-like *Diprotodon*, the buffalo-like *Zygomaturus*, a marsupial lion, *Thylacoleo*, more and larger kangaroos, and the giant wombat *Phascolomys*.

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Chapter II—continued

Part 5 — Entomology in Western Australia

With Particular Reference to Agriculture

(Contributed by the Entomology Branch, Department of Agriculture)

The entomological field in Western Australia is so vast and the number of active workers on the subject so few that much still remains to be learned about the insects found in this State. A wide range of environmental conditions exists, from the tropical north to the temperate south, and the geographical isolation of the State has allowed the development of numerous endemic forms. As may be expected, the insect fauna of the Kimberley Division shows closer affinities with that of North Queensland than with the lower half of the State. The central desert, which reaches the coast to the south along the Great Australian Bight and to the north along the Eighty Mile Beach, forms an effective barrier discernible in the distribution of flora, mammals, insects and birds.

Owing to the limitations of space no attempt has been made to cover all the various insect orders which occur in the State, but the economic importance of various groups and their influence on major agricultural industries have been outlined, and some of the more outstanding forms of general interest have been mentioned. There are several references to beneficial insects which have been introduced to the State for the control of agricultural pests. This reflects a worldwide trend towards the use of biological control measures which can operate in conjunction with, and sometimes replace, chemical pesticides. In Western Australia, the use of natural agents in pest control is an increasingly important facet of agricultural research.

Order Collembola (Springtails)

The springtails include the lucerne flea, *Sminthurus viridis* (Linnaeus) which was introduced into this State from eastern Australia in about 1910. It has spread to almost all the clover-growing areas in the south-west and is a very serious pasture pest. Partial control is exercised by the predatory pasture snout mite, *Bdellodes lapidaria* (Kramer).

Order Odonata (Dragonflies and Damselflies)

These insects are predatory in both the immature and adult stages and are usually regarded as beneficial creatures. However, they sometimes injure vegetable seedlings by ovipositing into furrow-irrigated crops. This has occurred mainly at Carnarvon where surface water is scarce and where irrigated plants are presumably mistaken for aquatic vegetation.

In order to survive in the diverse climatic conditions which exist in Western Australia, some members of the dragonfly group have developed the ability to breed in highly saline waters and to take advantage of ephemeral inland pools.

Orders Orthoptera, Mantodea, Blattodea, Phasmatodea (Grasshoppers, Locusts, Mantids, Cockroaches, etc.)

The grasshoppers and locusts are represented by a large number of different species. The most important pest form is the small plague grasshopper, *Austroicetes cruciata* (Saussure). The normal habitat of this species lies roughly between the 200 millimetre and the 400 millimetre isohyets. For breeding it favours hard, bare soil and as extensive areas once utilised for wheat growing have now reverted to grazing, these uncultivated tracts periodically give rise to serious grasshopper swarms, which menace the adjacent wheat lands. The Australian plague locust,

Chortoicetes terminifera (Walker), so troublesome in other States, occurs in Western Australia but rarely as a plague species. During the last few years, the wingless grasshopper, *Phaulacridium vittatum* (Sjostedt) has been causing increasing damage to lucerne and other summer crops, particularly in south coastal areas. In the Kimberley the yellow-winged locust, *Gastrimargus musicus* (Fabricius), the migratory locust, *Locusta migratoria* (Linnaeus) and the spur-throated locust, *Austracris guttulosa* (Walker) assume plague proportions, but in the southern agricultural districts they occur in the solitary phase only. The mantids (Mantidae) are represented by many different species. Their well-developed fore-limbs are admirably adapted for catching prey and, like their foliage-feeding relatives the phasmatids or leaf insects (Phasmatidae), their colouring harmonises remarkably with the sticks and leaves on which they rest. The cockroach fauna includes a large number of native species as well as several introduced forms. The commonest pest species is the cosmopolitan American cockroach, *Periplaneta americana* (Linnaeus). Some large and quite colourful forms occur in the inland regions with the genus *Polyzosteria* well represented.

Order Isoptera (Termites)

The so-called white ant is a serious pest in all parts of the State. Earth-dwelling types occur mainly, and among the most important species may be cited the giant termite, *Mastotermes darwiniensis* Froggatt of the north and the widely distributed subterranean termite, *Coptotermes acinaciformis* (Froggatt). The large mounds of the spinifex termite, *Nasutitermes triodiae* (Froggatt) are characteristic of certain landscapes in the pastoral areas. Heavy annual losses are caused by termite damage.

Order Phthiraptera (Lice)

Indigenous species occur on birds and native mammals, and various introduced forms infest domestic poultry, horses, cattle and sheep.

Order Thysanoptera (Thrips)

This order is represented locally by a large number of native species as well as several introduced forms. The most serious native species is the plague thrips, *Thrips imaginis* Bagnall which may swarm in apple blossoms and seriously affect the crop setting.

Thrips tabaci Lindeman, often called the onion thrips, is a carrier for the plant disease spotted wilt. Severe damage to tomato plants may result from this virus.

Order Hemiptera (Bugs, Aphids, Scale Insects)

This group contains a large number of pest species, many of them introduced. The green vegetable bug, *Nezara viridula* (Linnaeus) is now present throughout the State but is well controlled by the introduced parasitic wasp, *Trissolcus basalis* (Wollaston). The native Rutherglen bug, *Nysius vinitor* Bergroth may at times swarm on vegetables and fruit trees, but seems less serious in this State than on the other side of the continent. The crusader bug, *Mictis profana* (Fabricius), so named because of the light-coloured St Andrew's cross on the back of the adult, feeds normally on acacias and other native plants, but it frequently invades cultivated areas and it may be troublesome to young citrus. The apple dimpling bug, *Campylomma livida* Reuter is a native species which sometimes causes severe malformation of apples by feeding upon the very small developing fruit.

One native aphid, *Anomalaphis comperei* Pergande has been recorded. The only two districts from which it has so far been collected are Albany and Karridale where it has been found infesting native peppermint, *Agonis flexuosa*. A point of interest about these occurrences is that the aphids were associated with a heavy Argentine ant infestation in the area. Since the removal of the ants no further aphids have been discovered.

Numerous introduced species occur as pests on vegetables, garden plants and fruit trees. The green peach aphid, *Myzus persicae* (Sulzer) occurs on peaches, potatoes, rape, etc.; citrus and apple trees are attacked by the black citrus aphid, *Toxoptera citricidus* (Kirkaldy) and

the woolly aphid, *Eriosoma lanigerum* (Hausmann) respectively, and the cabbage aphid, *Brevicoryne brassicae* (Linnaeus) is found on cabbages, cauliflowers, rape, etc. The cowpea aphid, *Aphis craccivora* Koch which carries a virus disease of subterranean clover known as 'stunt' has also been found attacking lupins. The spotted alfalfa aphid, *Therioaphis trifolii* (Monell) f. *maculata* was found in eastern Australia in 1977 and was first detected in Western Australia in 1978. It is a serious pest of lucerne and has since spread to all lucerne growing areas of the State. Three species of parasitic wasp have been introduced to help in its control. One of these wasps, *Trioxys complanatus* Quilus has become established in south-west lucerne areas. The bluegreen aphid, *Acyrtosiphon kondoi* Shinji, another exotic pest species which attacks lucerne, medics and clovers, was recorded for the first time in Western Australia in June 1979. The parasitic wasp *Aphidius ervi* Haliday has been introduced to combat this pest.

Of the native coccids the gall-forming members of the genus *Apiomorpha* are among the most remarkable. The woody galls in which the female insects pass their days vary from minute structures to woody knobs the size of an apple. From an economic point of view, however, the various introduced scale insects demand most attention. Included in the list of pest species are the following:

- San Jose scale, *Comstockaspis perniciosus* (Comstock), which is a serious pest of apples,
- California red scale, *Aonidiella aurantii* (Maskell), which is found mainly on citrus but with a wide host range,
- black scale, *Saissetia oleae* (Olivier), which is found attacking citrus, stone fruits and garden shrubs,
- white wax scale, *Gascardia destructor* (Newstead), which is mainly a pest of citrus but also attacks many cultivated shrubs,
- soft brown scale, *Coccus hesperidum* Linnaeus, which has a wide host range but is of greatest importance on citrus, and
- grass-crown mealybug, *Antonina graminis* (Maskell), which is a widespread and troublesome pest causing damage to lawns particularly in warm parts of the State.

Order Coleoptera (Beetles)

This order is the dominant one among existing insects and is represented in Western Australia by many and varied forms. The carnivorous ground beetles (Carabidae) are widely distributed, one of the best-known species being the green carab beetle, *Calosoma schayeri* Erichson. The tiger beetles, of the sub-family Cicindelinae, are of interest not only because of the metallic colouration seen in many forms but because of their association with the inland salt-lakes. The larvae are subterranean and may be collected by digging on the lake margins.

The ladybirds (Coccinellidae) comprise a group of considerable economic importance and in addition to native species the State contains a number specially introduced to combat various scale insects and aphids. Among the best known of the introduced species are the mealybug ladybird, *Cryptolaemus montrouzieri* Mulsant and the common spotted ladybird, *Harmonia conformis* (Boisduval). The larvae of *Cryptolaemus* are covered with a whitish material which makes the insect superficially resemble the mealybugs upon which it feeds. *H. conformis*, in conjunction with the parasitic wasp, *Aphelinus mali* (Haldeman), plays an important role in combating the woolly aphid of apple trees. Destructive leaf-eating ladybirds belonging to the genus *Henosepilachna* were once found only in the northern parts of the State where they attack vegetables, especially pumpkins and melons. In 1956, specimens of *Henosepilachna* were collected in Perth and since then they have become established in several suburban areas.

The jewel beetles (Buprestidae) contain some of the most colourful beetles to be found anywhere in the world. Western Australia is particularly rich in species and at times the beetles may be found in large numbers on flowering mallee and sandplain flora. One of the most

attractive is the metallic green *Stigmodera gratiosa* Chevrolat, and one of the largest is *Julodimorpha bakewelli* White, measuring approximately seventy millimetres in length.

The cockchafers or scarabs (Scarabaeidae) are represented by a great diversity of forms. Several species may swarm on to flowering fruit trees and roses in the early summer and are popularly known as spring beetles. The bronze-coloured *Colymbomorpha vittata* Britton is a common pest of apple trees during the blooming period and the saddle-backed beetle, *Phyllotocus ustulatus* Blanchard sometimes visits citrus blossoms in large numbers. An introduced species commonly known as the African black beetle, *Heteronychus arator* (Fabricius) has gained a firm footing in the State and is a troublesome pest of lawns and turf. It is also growing in importance as a pasture and vegetable pest. A native species of *Colpochilodes* has caused spasmodic damage to cereal crops and clover pastures in the southern portions of the State.

The longicorn beetles (Cerambycidae) are a group of wood-boring insects represented by a number of different species. They are often blamed for the death of forest eucalypts, although investigations have shown that heavy beetle infestations are usually secondary and that healthy trees are seldom seriously affected by the beetles. The larval stage of this group is the so-called 'bardee', at one time prized by the Aborigines as food. They are not a pest of structural timber as they do not attack seasoned material.

The leaf beetles (Chrysomelidae) may superficially resemble ladybirds in general appearance as some of them are rounded and quite brightly coloured. Two species have been introduced into the State for the purpose of combating St John's wort, a troublesome weed in some districts. *Chrysolina quadrigemina* (Suffrian) and *C. hyperici* (Forster) were originally introduced into Australia from the South of France and liberated in Victoria with very satisfactory results. The local colonies were obtained from the latter source and have become established in several districts. In some situations a reduction in St John's wort can be attributed definitely to beetle activity, but in many areas the picture is obscure because of the extensive use of chemical sprays.

Common pest species in eastern Australia are the pumpkin beetles, *Aulacophora hilaris* (Boisduval) and *A. palmerstoni* Blackburn. These beetles are found in the north of the State but do not extend into the cooler latitudes.

The weevils (Curculionidae) are a very specialised group characterised by the presence of a rostrum or 'snout' which bears the mouth and antennae. The genus *Leptopius* contains a number of large greyish weevils, many of which breed in association with acacias. One of the best-known members of the family is the redlegged weevil, *Catasarcus impressipennis* (Boisduval) which feeds on eucalypt foliage and may disfigure young street trees. The almost world-wide rice weevil, *Sitophilus oryzae* (Linnaeus) is our principal weevil pest of stored grain, but the granary weevil, *S. granarius* (Linnaeus) also occurs. Two common orchard pests are the introduced apple weevil, *Otiorynchus cribricollis* Gyllenhal and Fuller's rose weevil, *Asynonychus cervinus* (Boheman). The small lucerne weevil, *Atrichonotus taeniatus* (Berg) and the whitefringed weevil, *Graphognathus leucoloma* (Boheman) have recently increased their attack on the roots of lucerne and potato tubers in the lower south-west and coastal areas. Two other pest species of weevil which appear to have been introduced recently into this State are the sitona weevil, *Sitona discoideus* Gyllenhal, a pest of legumes, and the garden weevil, *Phlyctinus callosus* Boheman.

Order Neuroptera (Lacewings)

This order contains a number of useful insects, for many of the neuropterous larvae feed upon scale insects and other pests. The family Myrmeleontidae has a number of large, rather dragonfly-like species, the larval stages of which build conical sand pits and are commonly known as ant lions. Amongst the most remarkable of the local lacewings are two members of the family Nemopteridae in which the hind wings are greatly modified. In the genus *Croce* they

are long and thread-like and in the spoonwinged lacewing, *Chasmoptera hutti* Westwood they are spoon-shaped or paddle-shaped.

Order Diptera (Flies, Mosquitoes, etc.)

This group contains a vast number of species, many of which are of major economic importance.

The mosquitoes are well represented, the commonest species being the brown house mosquito, *Culex fatigans* Wiedemann and the dengue mosquito, *Aedes aegypti* (Linnaeus). The latter species is the carrier for dengue fever in the northern portion of the State. The anophelines are represented by the widely distributed *Anopheles annulipes* Walker and several much rarer forms. *A. annulipes*, together with *Aedes alboannulatus* Macquarie, have played an important part in the spread of the rabbit virus *Myxomatosis*.

Of the introduced flies, those causing most trouble are the Australian sheep blowfly, *Lucilia cuprina* (Wiedemann) and the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann). Recent research has revealed that the western goldenhaired blowfly, *Calliphora albifrontalis* Malloch and the lesser brown blowfly, *Calliphora nociva* Hardy are also important in sheep strike. The buffalo fly, *Haematobia irritans exigua* De Meijere is a serious stock pest in the Kimberley Division of the State, but so far has not become established in the cattle areas of the south. It is believed to have originally reached Australia on buffaloes introduced from Asia.

The common house fly, *Musca domestica* Linnaeus is widespread as is also the native bush fly, *Musca vetustissima* Walker.

Insecticides such as DDT, dieldrin and the various organic phosphates gave outstanding control of various fly pests for several years. The widespread development of resistance in both house fly and blowfly populations has greatly complicated the matter, however, and drawn attention to the importance of preventive measures, such as sanitation in the case of house flies, and the Mules operation and crutching in the case of sheep blowfly.

The March flies (Tabanidae) are well represented but, although their blood-sucking habits render them annoying both to livestock and humans they are not a serious pest.

Of the many useful flies may be mentioned the blowfly-like tachinids which parasitise caterpillars, grasshoppers and other pests and the bee flies (Bombyliidae) which parasitise the eggs of other insects. The maggots of the bombyliid fly, *Cyrtomorpha flaviscutellaris* Roberts are commonly found in the egg pods of the small plague grasshopper, *Austroicetes cruciata* (Saussure).

Order Siphonaptera (Fleas)

A number of introduced as well as native fleas occur in this State. The rabbit stickfast flea, *Echidnophaga myrmecobii* Rothschild, found originally on native mammals, is a very common parasite of rabbits in the drier parts of the State. The poultry stickfast flea, *E. gallinacea* (Westwood) closely resembles the former species but is mainly a pest of poultry and domestic animals. The oriental rat flea, *Xenopsylla cheopis* (Rothschild), the human flea, *Pulex irritans* Linnaeus and the cat and dog fleas, *Ctenocephalides felis* (Bouche) and *C. canis* (Curtis) are among the most important introduced species.

Order Lepidoptera (Moths, Butterflies, etc.)

The primitive swift moths (Hepialidae) are represented locally by a number of very beautiful forms. The larvae are wood borers but do not occur in sufficient numbers to constitute a serious forestry pest. Several large and striking members of the genus *Aenetus* occur in the lower south-west.

A group of small native moths of the family Pyralidae, sub-family Crambinae and commonly known as pasture webworm moths, *Hednota pedionoma* (Meyrick), *H. crypsichroa* Lower, etc. are serious pests of cereal crops (excepting oats) and grass pastures. Depredations are controlled by planting on clean fallow, but the recent trend towards ley farming has greatly favoured these pests.

A family of considerable interest to the orchardist is the Tortricidae, in which group are included the codling moth, *Cydia pomonella* (Linnaeus) and the oriental fruit moth, *C. molesta* (Busck). Outbreaks of codling moth have occurred on a number of occasions but drastic eradication measures have so far prevented this major apple pest from becoming permanently established and have given Western Australia the distinction of being the only large apple-producing country where the moth is not a major problem. The oriental fruit moth has not recurred since eradication measures were taken against an outbreak in the Bickley Valley in 1952.

One of the best-represented families is the Noctuidae which contains several important pests. Included under this heading are the native budworm and the cotton bollworm, *Heliothis punctiger* Wallengren and *H. armiger* (Hubner), the cluster caterpillar, *Spodoptera litura* (Fabricius), the rough bollworm, *Earias huegeli* Rogenhofer, the brown cutworm, *Agrotis munda* Walker, the southern armyworm, *Persectania ewingii* (Westwood), the common armyworm, *Mythimna convecta* (Walker) and the northern armyworm, *Mythimna separata* (Walker). A parasitic wasp, *Apanteles ruficrus* Haliday has been introduced to help in the control of armyworms and cutworms. The fruitsucking moth, *Othreis materna* (Linnaeus) also belongs to this group and causes heavy losses in citrus fruit grown around pastoral homesteads in the Kimberley and the north-west. In almost all cases where moths and butterflies are regarded as pests it is only the caterpillar stage which is destructive. The fruit-sucking moth, however, has a rasp-like proboscis capable of piercing orange and citrus skins and then sucking up the juice. Fortunately the creatures do not normally range to the citrus areas of the south-west.

One of the most remarkable members of the family Agaristidae is the whistling moth, *Hecatesia thyridion* Feisth. The male of this species is active just at sunset and makes a loud clicking noise during its fast circling flight.

Other common moth pests are the cabbage moth, *Plutella xylostella* (Linnaeus), the potato moth, *Phthorimaea operculella* (Zeller) and the apple looper moth, *Chloroclystis laticostata* (Walker).

The beautiful dryandra moth, *Carthaea saturnioides* Walker with its large eye spots on the wings superficially resembles the emperor moths. Its range is restricted to south-west Australia.

The butterfly fauna of the State lacks many large and showy forms. Some of the northern species such as *Hypolimnas bolina nerina* Fabricius are quite colourful but the State has nothing to compare with the conspicuous and beautiful species found in the tropics of eastern Australia.

The blues (Lycaenidae) are well represented and the association of many larvae with ant nests renders the group a particularly interesting one.

The skippers (Hesperiidae) are relatively drab-coloured butterflies with strong powers of flight. Over twenty species are recorded from the State and some forms are endemic to the south-west.

Only one butterfly is of economic importance and that is the introduced cabbage white butterfly, *Pieris rapae* (Linnaeus) which reached this State in 1943. It attacks cabbages, cauliflowers and related plants as well as one or two other strong-tasting herbs such as watercress. The butterfly belongs to the whites, or Pieridae, which group contains a number of native species. Several members of this family, including the cabbage white, display extraordinary powers of flight and the caper white, *Anaphaeis java teutonia* (Fabricius) has been observed to carry out mass migrations of remarkable proportions on the eastern side of the continent.

A rather showy butterfly which appears to have become established here recently is the wanderer or monarch, *Danaus plexippus plexippus* (Linnaeus). This large orange and black butterfly has apparently reached Western Australia from the other States. The colourful larvae feed on certain noxious weeds such as the introduced narrow-leaf cotton-bush, *Asclepias fruticosa*.

Order Hymenoptera (Bees, Wasps, Ants)

The wood wasps and sirex wasps (Siricidae) include several pests which have been established in New Zealand and Tasmanian pine forests. Imported timber has been fumigated from time to time following the location of infested material.

The sawflies (Pergidae and Tenthredinidae) are represented locally by a number of native forms. The larvae of the genus *Perga* may often be seen in caterpillar-like clusters amongst the foliage of eucalypts. An introduced sawfly, the pear and cherry slug, *Caliroa cerasi* (Linnaeus), is a common pest on pear and plum trees. The smaller parasitic wasps (ichneumonids, chalcids and their allies) are well represented and play an important role in combating many insect pests. Some attack insect eggs while others parasitise caterpillars, aphids and scale insects, so that without their aid the problem of pest control would be even more difficult than at present.

The ant fauna (Formicidae) of the State is extremely varied. One of the best-known native species is the meat ant, *Iridomyrmex purpureus* (F. Smith) which often nests on gravel paths and roadsides. Among the most remarkable of the local ants may be listed *Camponotus inflatus* Lubbock, the honey-pot ant of the interior, and *Myrmecia regularis* Crawley of the karri forest area which has the frog *Metacrinia nicholli* (Harrison) as a tolerated guest in its nest. The honey-pot ant derives its name from the fact that certain individuals in the nest store honey until their abdomens become inflated to the size of grapes. This honey is then regurgitated to other ants as required. These ants were once prized by Aborigines as a food delicacy.

Two important introduced ant pests are the Argentine ant, *Iridomyrmex humilis* (Mayr) and the Singapore ant, *Monomorium destructor* (Jerdon). The Argentine ant was once widespread in the metropolitan area, Albany and Bunbury, with several other country outbreaks. The insect has been reduced in recent years, however, as a result of a large-scale control campaign. The scheme involved the spraying of all infested areas, with government-controlled labour, and a restriction on the movement of goods likely to spread the pest. From the commencement of the campaign in 1954 to 30 June 1981 28,317 hectares have been treated at a cost of approximately \$3.2 million.

The social wasps (Vespidae) were once known only from the northern portion of the State. About 1949, however, colonies of *Polistes variabilis* Fabricius were located in various parts of the Perth suburban area and they have now extended their range into surrounding country areas.

The European wasp, *Vespula germanica* (Fabricius) was detected in Western Australia for the first time in January 1977, in the Mosman Park area. Subsequent surveys and follow-up of reports from the public resulted in a further five nests being located in the suburbs of Cottesloe, Peppermint Grove and Attadale. All nests of this troublesome exotic insect were destroyed and it is hoped that the wasp has now been eradicated. The European wasp is similar in appearance to a honey bee but has distinct bright yellow and black markings across the body.

During surveys for the above insect, several colonies of an exotic paper nest wasp species, *Polistes gallicus* (Linnaeus) were discovered, mainly in the suburbs of Bicton, Palmyra and Beaconsfield. Coincidentally, this insect is similar in appearance to the European wasp in that it is roughly the same size and it has yellow and black markings. It differs by having a more slender body and a more pronounced 'wasp waist'.

The burrowing wasps, including the sand wasps (Pompilidae), the flower wasps (Scoliidae) and velvet ants (Mutillidae) are well represented. The mutillids are, of course, not true ants but the wingless females bear a superficial resemblance to ants which is further accentuated by their ability to inflict a painful sting. The flower wasps are particularly numerous and winged males carrying wingless females are common around flowering plants in the early summer. Of the velvet ants the black and white *Ephutomorpha rugicollis* Westwood is the best known. Most of the wasps mentioned are beneficial, for they store caterpillars and other insects in mud nests and underground burrows to serve as food for the wasp grubs.

The majority of native bees are solitary forms although some, like the Colletidae, often choose a common site for nest burrowing and hundreds of tunnels may be located close to one another.

The leaf-cutting bees (Megachilidae) often attract notice from their habit of cutting circular pieces from rose leaves and other foliage for use in nest construction.

The only native social bees belong to the genus *Trigona* which does not occur in the southern portions of the State.

CLASS ARACHNIDA (Spider, Mites, Ticks, etc.)

Creatures grouped under the above heading are, of course, not true insects and will be dealt with only very briefly. Several forms are of considerable economic importance, as for example the cattle tick, *Boophilus microplus* (Canestrini) and the fowl tick, *Argas persicus* (Oken). The cattle tick is confined to the Kimberley Division and its range corresponds roughly with that of the buffalo fly. The ornate kangaroo tick, *Amblyomma triguttatum* C.L. Koch is a common species. It is occasionally collected as an accidental parasite on domestic animals and man.

The most serious mite pest is the redlegged earth mite, *Halotydeus destructor* (Tucker) which is very destructive to young legumes and other seedlings. It may be particularly troublesome on subterranean clover pastures. Other mites of importance to orchardists and market gardeners are the spider mites (Tetranychidae) which include such cosmopolitan species as the twospotted mite, *Tetranychus urticae* Koch and the bryobia mite, *Bryobia rubrioculus* (Scheuten). A predacious mite, *Typhlodromus occidentalis* Nesbitt has recently been introduced to Western Australia for the control of the twospotted mite. The predator has become established in a Manjimup apple orchard where its progress is being monitored by research workers.

Spiders constitute a large group, most of which are useful on account of their insectivorous habits, although bites from some of the larger species may produce painful after-effects. The most dangerous local spider is the redback spider, *Latrodectus mactans hasselti* Thorell. This species, whose bite may even prove fatal, is easily recognised by the conspicuous red streak down the centre of the abdomen.

Scorpions of various kinds are widely distributed over the State and the larger ones may be able to inflict a painful sting. There is one record of a baby dying at Pemberton from the effects of scorpion venom but no other reports of serious after-effects are available and, generally speaking, the group is of little local importance.

FURTHER SOURCES OF INFORMATION

The difficulties confronting anyone trying to review in a few pages the entomological fauna of such a large State as Western Australia will be better appreciated if it is remembered that in the *Western Australian Year-Book* for 1898-99 the late A. M. Lea expressed the opinion that there were about 30,000 species of insects indigenous to this State. Many additions have been made in the last eighty years or so and one is faced with the problem of deciding which creatures warrant special mention and which must be excluded for lack of space. The general reader interested in consulting other short reviews of the local insect fauna is referred to A. M. Lea's article in the 1898-99 Year Book under the title of 'The Insects of Western Australia'; in the Year Book for 1900-01 the late H. M. Giles wrote 'A Glimpse of Western Australian Entomology'.

Two short summaries have also appeared in conjunction with science conferences in this State. The *Handbook and Review* published for the 1926 meeting of the Australasian Association for the Advancement of Science contained an article by L. J. Newman and the *Handbook* for the 1947 meeting of the Australian and New Zealand Association for the Advancement of Science printed a short summary of the local insects by L. Glauert.

Readers interested in more technical summaries are referred to Professor G. E. Nicholl's 'The Composition and Biographical Relation of the Fauna of Western Australia' (*A.N.Z.A.A.S.*, Vol. XXI, 1933, p. 93), the relevant volumes of *Die Fauna Sudwest-Australiens* by Michaelsen and Hartmeyer, 1907-1930, and the report of the Swedish expedition under Dr E. Mjöberg.

More detailed information relating to the forms of economic importance will be found in the publications of the Western Australian Department of Agriculture.

Literature covering the general aspects of Australian entomology is given below. Some of these publications are now out of print and possibly only obtainable through libraries.

ANON. *The Insects of Australia*. Division of Entomology, C.S.I.R.O. University Press, Melbourne, 1970. 1,029 pp.

BARRETT, C. and BURNS, A. N. *Butterflies of Australia and New Guinea*. N. H. Seward Pty. Ltd., Melbourne, 1951. 187 pp.

BURNS, ALEXANDER and ROTHERHAM, E. R. *Australian Butterflies In Colour*. A. H. & A. W. Reed, Sydney, 1969. 112 pp.

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COMMON, I. F. B. *Australian Butterflies*. Jacaranda Press, Brisbane, 1966. 131 pp.

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GOODE, JOHN. *Insects of Australia*. Angus and Robertson Pty. Ltd., Sydney, 1980. 260 pp.

HEALY, ANTHONY and SMITHERS, COURTENAY. *Australian Insects in Colour*. A. H. & A. W. Reed, Sydney, 1971. 112 pp.

HUGHES, R. D. *Living Insects*. The Australian Naturalist Library. Collins, Sydney, 1975. 304 pp.

MCKEOWN, K. C. *Australian Insects*. An Introductory Handbook. Published by R.Z.S. of N.S.W., Sydney, 1945. 303 pp.

MAIN, BARBARA YORK. *Spiders of Australia*. Axiom Distributors, South Australia, 1981. 124 pp.

RIEK, EDGAR. *Insects of Australia*. Jacaranda Press, Brisbane, 1963. 128 pp.

TILLYARD, R. J. *The Insects of Australia and New Zealand*. Angus and Robertson Ltd., Sydney, 1926. 560 pp.

WATERHOUSE, G. A. *What Butterfly is That? A Guide to the Butterflies of Australia*. Angus and Robertson Ltd., Sydney, 1932. 291 pp.

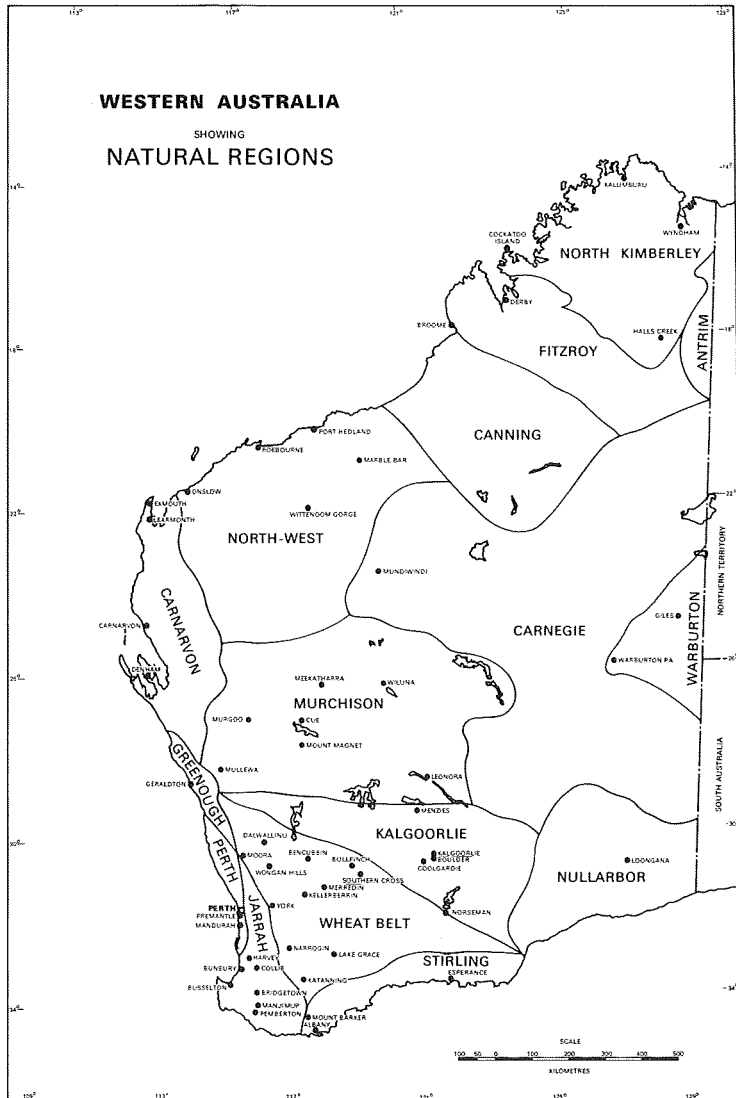
WATSON, J. A. L. *The Dragonflies (Odonata) of South-Western Australia*. Western Australian Naturalists' Club, Perth, 1962. 72 pp.

Chapter II — continued

Part 6 — Natural Regions

Contributed by Rex T. Prider, B.Sc., Ph.D., F.G.S., M. Aust.I.M.M.
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The physical features, geology, climate, flora and fauna of Western Australia have been outlined earlier in this Chapter and the subdivision of the State into 'natural regions' may now be considered. A Natural Region is one clearly marked off from neighbouring regions by topographical, geological, climatic, or biological conditions, or by combinations of these, so that, as far as Man's activities are concerned, they have different economic possibilities.



CHARACTERISTICS OF THE NATURAL REGIONS OF WESTERN AUSTRALIA

The subdivision of Western Australia into Natural Regions (see accompanying map) has been described by E. de C. Clarke in *J. Roy. Soc. W. Aust.*, vol. XII, 1927, pp. 117-32. A summary of the characteristics of these different Natural Regions (reprinted by courtesy of the University of Western Australia Press from Clarke, Prider and Teichert: *Elements of Geology for Western Australian Students*) is given below.

NATURAL REGION	TOPOGRAPHY	GEOLOGY	RAINFALL	WATER SUPPLY (a)	VEGETATION, ETC
ANTRIM (geographic)	Tableland	Cambrian sediments and lavas	Summer, monsoonal, 500 to 1,000 millimetres	Catchments, wells and artesian	Grassland and savannah
NORTH KIMBERLEY (geographic)	Dissected stony tableland	Younger Precambrian	Summer, monsoonal, 750 millimetres or more	Streams, springs, catchments	Luxuriant in valleys, sparse on tableland
FITZROY (chief river)	Very wide valleys and low hills	Palaeozoic (largely Permian)	Summer, monsoonal, 500 to 750 millimetres	Catchments and artesian	Grassland and savannah
CANNING (A. W. Canning, surveyor and explorer)	Sand ridges and tabletop hills	Palaeozoic and Mesozoic	Summer, 375 millimetres or less	Springs, pools, artesian water? (undeveloped)	'Spinifex' (species of <i>Triodia</i>) and desert shrubs
CARNEGIE (David Carnegie, explorer)	Sand ridges and tabletop hills	Mesozoic, Palaeozoic and Younger Precambrian	Variable and unreliable, probably about 125 millimetres	Catchments, wells	'Spinifex' and desert shrubs
WARBURTON (Warburton Range)	Hills (some over 900 metres) separated by sandy country	Older Precambrian	Variable and unreliable, perhaps about 125 millimetres. Probably better than Carnegie Region owing to high hills	Catchments, wells, some springs	'Mulga' (species of <i>Acacia</i>) and 'Spinifex'
NORTH-WEST (common usage)	Rugged hills. Rivers in well-defined valleys	Younger and Older Precambrian. Many economic minerals	Variable, unreliable, 375 millimetres or less	Wells, catchments, pools	'Spinifex', few shrubs and trees
MURCHISON (common usage)	Ridge hills and breakaways. Rivers in shallow beds. Salt 'lakes'	Older Precambrian. Economic minerals especially gold and nickel	Summer or winter, unreliable, 250 millimetres or less	Wells (potable groundwater)	'Mulga'. Eucalypts scarce except along rivers

KALGOORLIE (chief town)	Less hilly than Murchison. Salt 'lakes'. No defined watercourses except salt lake system	Older Precambrian. Economic minerals especially gold and nickel	Mainly winter, unreliable, 250 millimetres or less	Catchments. Ground water too salty for use	Eucalypt forest, especially Salmon Gum (<i>E. salmonophloia</i>), Gimlet (<i>E. salubris</i>) and Red Morrel (<i>E. longicornis</i>)
WHEAT BELT (common usage)	Same as Kalgoorlie Region	Older Precambrian, but few 'green-stones'	Winter, reliable, 250 to 500 millimetres	Similar to Kalgoorlie Region, but ground water potable in many places; therefore wells frequent	Eucalypt forest — Salmon Gum, Gimlet, and Morrel
JARRAH (chief timber)	More dissected than Wheat Belt Region, especially near Darling Scarp	Like Wheat Belt Region but there is an extensive cuirass of laterite	Winter, reliable, 625 to 1,000 millimetres	Streams and springs	Forest of Jarrah (<i>E. marginata</i>), Wandoo (<i>E. Wandoo</i>), Karri (<i>E. diversicolor</i>) and Marri (<i>E. calophylla</i>)
CARNARVON (chief town)	Elevated plain with table-top hills	Palaeozoic, Mesozoic, Tertiary and later	Summer or winter, very unreliable, about 250 millimetres	Artesian in many places. Catchments, pools	Sparse scrub in north, denser in south
GREENOUGH (river)	Sandstone tableland	Mesozoic and older	Winter, 375 to 500 millimetres	Springs, wells and catchments	Scrub
PERTH (chief town)	Coastal plain	Mesozoic and later	Winter, reliable, 500 to 875 millimetres	Springs, wells, artesian	Scrub, swamp and forest
STIRLING (prominent range)	Undulating tableland with abrupt ranges	Siliceous Tertiary sediments with inliers of Younger and Older Precambrian	Winter, 375 millimetres or less	Catchments. Stream water generally too salty for use	Heath and swamp
NULLARBOR (geographic)	Tableland, no hills	Calcareous Tertiary sediments	Winter, 250 millimetres or less	Catchments. Sub-artesian	Poor grassland

(a) 'Wells' refers to those that draw on ground water, but are not artesian. 'Catchments' refers to water collected on the surface — naturally in gnammas holes, artificially by conserving the run-off. 'Pools' refers to pools in watercourses and includes rock holes.

Many methods for the subdivision of the State have been suggested — based on climate, soil and ecology, physiography (geomorphology) and geology (including geological structure). These, together with Land and Statistical Divisions, have been dealt with in some detail by Gentili in *Western Landscapes*, pp. 3-48. The scheme of 'natural regions' summarised above, which was first devised by E. de C. Clarke in 1926, taking note of all these variables, has stood the test of time well, although some of its details, in view of our increase in geological knowledge of the State and utilisation of light country by minor element studies, could be revised, and a finer division into subregions made.

FURTHER SOURCES OF INFORMATION ON THE
NATURAL REGIONS OF WESTERN AUSTRALIA

CLARKE, E. de C. 'Natural Regions in Western Australia'. *J. Roy. Soc. W. Aust.*, vol. XII, 1927, pp. 117-32.

GENTILI, J. (ed.). *Western Landscapes*. University of Western Australia Press (Sesquicentenary Series), Nedlands, 1979.

CHAPTER III — CONSTITUTION AND GOVERNMENT

Western Australia is one of the six federated sovereign States which, together with the Northern Territory and the Australian Capital Territory, constitute the Commonwealth of Australia. Thus, in addition to having its own Parliament and executive government, it is represented in the federal legislature. As well as government at the Federal and State levels, there is a third system, that of local government, which functions through City Councils, Town Councils and Shire Councils.

OUTLINE OF CONSTITUTIONAL DEVELOPMENT

A Legislative Council was established in Western Australia shortly after its foundation as a Crown Colony and sat for the first time in February 1832. The Council was non-elective and consisted of the Governor and four senior officials. In 1839, membership was increased to nine when the Governor nominated four unofficial members. Additional appointments were made from time to time until the dissolution of the nominee Legislative Council in 1870 with the inauguration of representative government as provided for in the Australian Colonies Government Act of 1850. This Act, which enabled the establishment of representative governments in other Australian Colonies, withheld the privilege from Western Australia until such time as the Colony should be able to defray all costs of government from its own revenues, and it was not until 1870 that it was felt that Western Australia was able to satisfy this condition. The new Legislative Council, elections for which took place in October of that year, consisted of twelve elected members, three nominees and three officials. The number of members of the Council was increased in 1874 to 21, of whom 14 were elected, in 1882 to 24, of whom 16 were elected and in 1886 to 26, comprising 17 elected members, 5 nominees and 4 officials.

Following the passage by the Legislative Council of a Constitution Act in 1889 and subsequent representations made in London by delegates sent from the Colony, responsible government was granted to Western Australia by an Imperial Act assented to on 15 August 1890. Provision was made for the establishment of a Parliament of two Houses, to be known as the 'Legislative Council' and the 'Legislative Assembly', to replace the old Council. Proclamation of responsible government was made in Perth on 21 October 1890 and election of the thirty members of the Legislative Assembly took place in November and December. The fifteen members of the Legislative Council were nominated by the Governor, as provided in the Constitution Act, and the Parliament was officially opened on 30 December 1890. The Constitution Act of 1889, while prescribing a Council which was originally nominative, contained a provision that, after the expiration of six years or on the population of the Colony reaching 60,000, the Council should become fully elective. The required population was attained in 1893 and an amendment to the Act in that year enabled the election of twenty-one members to the Legislative Council, and at the same time increased the Legislative Assembly to thirty-three members. By an amendment of 1899, membership of the Legislative Council was raised to thirty and of the Legislative Assembly to fifty. Provision was made for the Legislative Assembly to be increased to fifty-one members by the *Constitution Acts Amendment Act (No. 2) 1965*. The increase in numbers, however, did not become effective until the State general election in 1968.

On 1 January 1901, Western Australia and the five other Australian Colonies were federated under the name of the 'Commonwealth of Australia', authority for the union having

been given by the Commonwealth of Australia Constitution Act which was passed by the British Parliament in 1900. By a provision of the Constitution Act the constituent parts of the Commonwealth previously designated 'Colonies' became known as 'States'. Under the Constitution, powers are divided between the Parliaments of the Commonwealth and of the States by conferring power in respect of specific subjects on the Commonwealth either exclusively or jointly with the States, leaving the remaining powers to the States.

Procedure in both Federal and State Parliaments is based on British practice. The legislatures consist of the Sovereign, represented by the Governor-General of Australia or the Governor of the State, and the elected members. In the field of executive government the British 'Cabinet' system has also been adopted. The members of the Cabinets must hold seats in the legislature as elected members. The Cabinet is responsible to the Parliament and continues in office only while holding the confidence of the Parliament. All Cabinet Ministers are members of the Executive Council, the supreme group of advisers to the Crown, and the Cabinet thus provides the executive government of the Commonwealth or the State. The Executive Council is presided over by the Governor-General of Australia or the Governor of the State and at its meetings, which are formal and official in character, the decisions of the Cabinet are given legal form, appointments are made, resignations accepted, proclamations issued and regulations approved.

VICE-REGAL REPRESENTATION

The Governor-General of Australia

Under the Commonwealth Constitution, ultimate executive power is vested in the Crown and is exercised by the Governor-General as the direct representative of the Sovereign. Appointment to the office is made by the Crown after consultation with the Prime Minister of the Commonwealth. The present Governor-General is His Excellency Sir Ninian Martin Stephen, P.C., A.K., G.C.M.G., K.B.E., K.St.J., who was sworn in on 29 July 1982. During the absence from Australia of the Governor-General it is usual for the senior among the State Governors to be appointed Administrator.

The Governor of Western Australia

The Governor of Western Australia is the personal representative of the Sovereign in the State and exercises the powers of the Crown in State matters. He is the titular head of the Government and performs the official and ceremonial functions attaching to the Crown. The present Governor of Western Australia, His Excellency Rear-Admiral Sir Richard John Trowbridge, K.C.V.O., K.St.J., was sworn in on 25 November 1980. In the event of the Governor's absence from Western Australia the Lieutenant-Governor of the State is appointed Administrator. If there is no Lieutenant-Governor it is customary for the Chief Justice of Western Australia to be appointed Administrator. The present Lieutenant-Governor, the Chief Justice Sir Francis Burt, K.C.M.G., received his commission on 11 May 1977, replacing Commodore Sir James Maxwell Ramsay, C.B.E., D.S.C., who was appointed Governor of Queensland.

The last Governor of Western Australia as a Colony was Lieutenant-Colonel Sir Gerard Smith, K.C.M.G., whose term of office expired on 29 June 1900 and the first Governor of the State was Captain Sir Arthur Lawley, K.C.M.G., who was sworn in on 1 May 1901. The names and dates of assumption of office of Governors and acting Governors from the foundation of the Colony to 1980 are shown in the previous issue of the Year Book.

THE FEDERAL PARLIAMENT

The legislative power of the Commonwealth is vested in a Federal Parliament which consists of Her Majesty the Queen (represented by the Governor-General), a Senate and a House of Representatives. Subject to the Constitution, the Federal Parliament is empowered to make laws concerning, among other things, defence, external affairs, customs and excise, trade and commerce with other countries and among the States, taxation, borrowing of money on public credit, currency and coinage, banking, insurance, navigation, fisheries, quarantine, posts and telegraphs, census and statistics, immigration, naturalisation and aliens, copyrights and trademarks, bankruptcy, marriage, divorce and matrimonial causes, social services, and conciliation and arbitration for the prevention and settlement of industrial disputes extending beyond the limits of any one State. The Constitution provides that, when a law of a State is inconsistent with a law of the Commonwealth, the Commonwealth law shall prevail and the State law shall, to the extent of the inconsistency, be invalid.

The qualifications necessary for membership of the Federal Parliament and for voting at federal elections are described in the *Official Year Book of Australia*. Under the provisions of the *Commonwealth Electoral Act 1973*, which was proclaimed operative from 21 March 1973, the age qualification for enrolment, voting and candidature for federal parliamentary elections was lowered from twenty-one years to eighteen years.

The payment of allowances to Senators and Members of the House of Representatives is provided for in the Constitution and a superannuation scheme is established under the provisions of the *Parliamentary Retiring Allowances Act 1948*.

The Senate

The Senate consisted originally of thirty-six members, six Senators being returned from each State. The Parliament is authorised by the Constitution to increase or decrease the number of members. The growth of the population since Federation having been such as to warrant a considerable enlargement of the Parliament, a Representation Act was passed in 1948 to provide for increased membership by raising from six to ten the number of Senators from each State. At the same time the alternative system of counting of votes in elections for the Senate was altered by the Commonwealth Electoral Act to one of proportional representation, a summarised description of which is given below.

The total number of first preference votes for all candidates is divided by one more than the number of candidates to be elected, and the resulting quotient, plus one, is taken as the quota necessary for each candidate to obtain in order to become elected. When the number of first preference votes received by an elected candidate is greater than the quota, and there are still vacancies to be filled, his votes in excess of the quota (surplus votes) are transferred in the following manner to the continuing candidates in proportion to the voters' preferences. The number of the elected candidate's surplus votes is divided by the number of his first preference votes, the resulting fraction representing the transfer value of his surplus votes. The totals of the elected candidate's ballot papers, after the latter have been arranged in parcels according to the next available preference for continuing candidates, are multiplied by the transfer value. This determines the number of the elected candidate's votes to be transferred to each continuing candidate, the method being to transfer, after random selection, the appropriate number of ballot papers which bear the next available preference for that candidate.

After the surplus votes of all candidates elected on the count of first preferences have been so transferred, any continuing candidate who has received a number of votes equal to or greater than the quota is elected.

This procedure of the transfer of surplus votes of elected candidates is continued, while there are vacancies to be filled, until the stage is reached where no continuing candidate has received the quota of votes. Then the candidate with the lowest votes is excluded, and the whole of his ballot papers are transferred to the continuing candidates according to preferences. Any continuing candidate thereby obtaining the quota is elected, and if there are still vacancies his surplus votes are transferred.

The process of exclusion and transfer of ballot-papers is repeated until remaining vacancies are filled by candidates obtaining the quota, or, in respect of the last vacancy, by obtaining a majority of votes, even if this is less than the quota.

When transferring the surplus votes of elected candidates other than those elected on the count of first preference votes, only those ballot papers which have been transferred to the elected candidates at the last preceding count are considered. Similarly, in the transfer of surplus votes of a candidate elected during the exclusion procedure, only the ballot papers transferred from the candidate last excluded are taken into account.

The exclusion of the candidate with the lowest votes and the distribution of his ballot papers operate also immediately after the count of first preference votes, where no candidate has obtained the quota.

The Act also provides for the filling of a long casual vacancy by the continuing candidate who, next after the periodical vacancies have been filled as above, first receives a number of votes equal to or greater than the quota.

Members are elected on the basis of adult suffrage by the people of the State which they represent. As provided by the *Commonwealth Electoral Act* 1918, enrolment as an elector is compulsory for all qualified persons except those who are Aboriginal natives of Australia. Aborigines, although entitled to enrol, are not required to do so. Voting is compulsory for all enrolled persons in terms of an amendment of 1924 which operated for the first time at elections held on 14 November 1925. The term of office of a Senator is normally six years and commences on the first day of July following his election. One-half of the members retire at the end of every third year and are eligible for re-election.

Elections for the Senate were last held on 18 October 1980. The following table shows the Western Australian membership of the Senate as from 1 July 1981.

WESTERN AUSTRALIAN MEMBERS OF THE SENATE

Due to retire on 30 June 1984		Due to retire on 30 June 1987	
Name	Political party	Name	Political party
Chaney, Hon. F. M.	Lib.	Crichton-Browne, N. A.	Lib.
Coleman, Ruth N.	A.L.P.	Durack, Hon. P. D., Q.C.	Lib.
Martyr, J. R.	Lib.	Giles, Patricia J.	A.L.P.
Thomas, A. M.	Lib.	McIntosh, G. D.	A.L.P.
Walsh, P. A.	A.L.P.	Withers, Rt Hon. R. G.	Lib.

A.L.P. = Australian Labor Party.

Lib. = Liberal Party of Australia.

The House of Representatives

State membership of the House of Representatives is on a population basis with the proviso that each State shall have at least five members. The Constitution provides further that the number of members of the House of Representatives shall be, as nearly as practicable, double the number of Senators. With the enlargement of the Senate from thirty-six to sixty members, the

membership of the House of Representatives was increased, from the date of the 1949 elections, from seventy-four to 121, not including a member for the Australian Capital Territory, which achieved representation for the first time at this election, and a member for the Northern Territory, which had been represented since 1922.

Western Australia's population growth had been such as to necessitate an increase in representation from five to eight, and this number was raised to nine in 1955 as a result of a redistribution following the Census of 30 June 1954. At the same time, the total number of members of the House of Representatives was increased to 122, excluding the two members for the internal Territories.

Consequent upon the population changes disclosed by the 1966 Census, a redistribution of the State electoral division boundaries was carried out in 1968 and the following representation in the House of Representatives became effective as from the general election held on 25 October 1969: New South Wales 45, Victoria 34, Queensland 18, South Australia 12, Western Australia 9, and Tasmania 5, the total number of members (excluding the members for the internal Territories) being increased from 122 to 123.

A redistribution of Western Australian electoral division boundaries was carried out in 1973, as a result of the population changes disclosed by the 1971 Census, and the State gained an additional seat in the House of Representatives. The tenth seat was named Tangney after Dame Dorothy Tangney, a former Labour senator for Western Australia. Representation of the Australian Capital Territory in the House was increased from one to two by the *Australian Capital Territory Representation (House of Representatives) Act 1973* and consequently the total number of members was raised to 127.

Members of the House of Representatives are elected for the duration of the Parliament, which is limited to three years, by the people of the electorate which they represent. As provided by the *Commonwealth Electoral Act 1918*, enrolment as an elector is compulsory for all qualified persons except those who are Aboriginal natives of Australia. Aborigines, although entitled to enrol, are not required to do so. Voting is on the preferential system and is compulsory for all enrolled persons in terms of an amendment of 1924 which operated for the first time at elections held on 14 November 1925.

Elections for the House of Representatives were last held on 18 October 1980. The next table shows the Western Australian membership of the House of Representatives at 30 June 1982.

WESTERN AUSTRALIAN MEMBERS OF THE HOUSE OF REPRESENTATIVES

Electoral division	Name	Political party	Electoral division	Name	Political party
Canning	Bungey, M. H.	Lib.	O'Connor	Tuckey, C. W.	Lib.
Curtin	Rocher, A. C.	Lib.	Perth	McLean, R. M.	Lib.
Forrest	Drummond, P. H.	Lib.	Stirling	Viner, Hon. R. I.	Lib.
Fremantle	Dawkins, J. S.	A.L.P.	Swan	Beazley, K. C.	A.L.P.
Kalgoorlie	Campbell, G.	A.L.P.	Tangney	Shack, P. D.	Lib.
Moore	Hyde, J. M.	Lib.			

A.L.P. = Australian Labor Party.

Lib. = Liberal Party of Australia.

THE STATE PARLIAMENT

The Crown, represented by the Governor, and the Parliament, comprising a Legislative Council and a Legislative Assembly, constitute the legislature of Western Australia.

Executive government is based, as in the case of the Commonwealth and in other States, on the system which evolved in Great Britain in the eighteenth century and which is generally

known as the 'Cabinet' system. The Cabinet consists of Ministers of the Crown chosen for the Ministry from members of Parliament belonging to the political party, or coalition of parties, which is in the majority in the Legislative Assembly. The Constitution requires that at least one of the Ministers be selected from members of the Legislative Council. In Western Australia, as in the other Australian States, the office of principal Minister is designated 'Premier'.

Since 1890, when responsible government was granted to Western Australia, there have been twenty-five separate Ministries as shown in the following table. No organised, political party existed in the Colony until the formation of a Labour party in the 1890s. A Labour Ministry assumed office in 1904.

MINISTRIES FROM 1890

Name of Premier	Political party	Date of assumption of office	Duration		
			Years	Months	Days
Forrest	(a)	1890 — 29 December	10	1	17
Throssell		1901 — 15 February	—	3	12
Leake		27 May	—	5	25
Morgans		21 November	—	1	2
Leake		23 December	—	6	8
James	Labour	1902 — 1 July	2	1	9
Daglish		1904 — 10 August	1	—	15
Rason	Liberal	1905 — 25 August	—	8	12
Moore	Liberal	1906 — 7 May	4	4	9
Wilson	Liberal	1910 — 16 September	1	—	21
Scaddan	Labour	1911 — 7 October	4	9	20
Wilson	Liberal	1916 — 27 July	—	11	1
Lefroy	Liberal	1917 — 28 June	1	9	20
Colebatch	Liberal	1919 — 17 April	—	1	—
Mitchell	Nat. and C.P. (coalition)	17 May	4	10	30
Collier	Labour	1924 — 16 April	6	—	8
Mitchell	Nat. and C.P. (coalition)	1930 — 24 April	3	—	—
Collier	Labour	1933 — 24 April	3	3	27
Wilcock	Labour	1936 — 20 August	8	11	11
Wise	Labour	1945 — 31 July	1	8	1
McLarty	L.C.L. and C.P. (coalition)	1947 — 1 April	5	10	22
Hawke	Labour	1953 — 23 February	6	1	10
Brand	L.C.L. and C.P. (coalition)	1959 — 2 April	11	11	1
Tonkin	A.L.P.	1971 — 3 March	3	1	5
Court	Lib. and C.P. (coalition)	1974 — 8 April	7	9	17
O'Connor	Lib. and C.P. (coalition)	1982 — 25 January	Still in office (b)		

A.L.P. = Australian Labor Party. C.P. = Country Party (c).
L.C.L. = Liberal and Country League (d). Nat. = Nationalist.

(a) No specific party designation. (b) At 30 June 1982. (c) The name of the Party was changed to the *National Country Party of Australia (W.A.) Inc.* on 5 May 1975. (d) The name of the Party was changed to *The Liberal Party of Australia (Western Australian Division) Incorporated* on 15 July 1968.

The Constitution Act of 1889 provided for a Ministry of five members. This number was increased to six by an amendment to the Act in 1896, to eight by another amendment in 1927, and to ten by the *Acts Amendment (Increase in Number of Ministers of the Crown) Act 1950*. The Ministry was increased to twelve members under the provisions of the *Constitution Acts Amendment Act 1965*. As authorised by the *Constitution Acts Amendment Act (No. 4) 1975* the

number of Ministers in the State Cabinet was increased from twelve to thirteen. The additional Minister, Mr I. G. Medcalf, M.L.C., was sworn in on 22 December 1975 as Attorney-General, and Minister for Federal Affairs. The names of the Ministers and the portfolios held by them at 30 June 1981 are shown in the next table.

The right to vote at parliamentary elections was extended to women by the *Constitution Acts Amendment Act 1899* and membership of either House was provided for by the *Parliament (Qualification of Women) Act 1920*. The first woman member of any Australian Parliament was Mrs Edith Dircksey Cowan, O.B.E., who was elected to the Legislative Assembly in March 1921 as member for West Perth. Mrs A. F. G. (later Dame Florence) Cardell-Oliver, M.L.A. for Subiaco, became the first woman Cabinet Minister in Australia when she joined the McLarty Ministry in 1947.

Payment of members was introduced in 1900 by a Payment of Members Act and a superannuation fund operates under the *Parliamentary Superannuation Act 1970-1980*.

THE MINISTRY FROM 16 AUGUST 1982

Name of Minister	Title of Office
Hon. Raymond James O'Connor, M.L.A.	Premier, Treasurer, and Minister Co-ordinating Economic and Regional Development
Hon. Edgar Cyril Rushton, M.L.A.	Deputy Premier, Minister for Transport, and Emergency Services
Hon. Richard Charles Old, M.L.A.	Minister for Primary Industry, Agriculture, and Fisheries and Wildlife
Hon. Ian George Medcalf, E.D., Q.C., M.L.C.	Attorney-General, Minister for Federal Affairs, and Leader of the Government in the Legislative Council
Hon. Andrew Mensaros, M.L.A.	Minister for Works, Water Resources, and Minister Assisting the Minister Co-ordinating Economic and Regional Development
Hon. Peter Vernon Jones, M.L.A.	Minister for Resources Development, Mines, and Fuel and Energy
Hon. Raymond Laurence Young, F.C.A., M.L.A.	Minister for Health
Hon. William Ralph Boucher Hassell, LL.B., M.A., M.L.A.	Minister for Police and Prisons, and Minister Assisting the Minister for Emergency Services
Hon. Gordon Edgar Masters, M.L.C.	Minister for Labour and Industry, and Immigration
Hon. Margaret June Craig, M.L.A.	Minister for Local Government, and Urban Development and Town Planning
Hon. Ian James Laurance, B.A., M.L.A.	Minister for Lands, Forests, and Conservation and the Environment
Hon. Barry John MacKinnon, B.Ec., A.A.S.A., M.L.A.	Minister for Industrial, Commercial and Regional Development, the North West, and Tourism
Hon. Robert Gerald Pike, M.L.C.	Chief Secretary, Minister for Cultural Affairs, and Recreation
Hon. James George Clarko, A.E., B.A., Dip. Ed., M.A.C.E., J.P., M.L.A.	Minister for Education
Hon. Richard Steele Shalders, M.L.A.	Minister for Community Welfare, Housing, and Consumer Affairs
Hon. Thomas Knight, A.F.A.I.M., A.A.I.B., M.L.C.	Parliamentary Secretary to the Cabinet

The Legislative Council

At 30 June 1982 the Legislative Council consisted of thirty-two members, each of the sixteen electoral provinces into which the State was divided being represented by two members. Election is for a term of six years and one-half of the members retire every three years.

The qualifications of a candidate for election to the Legislative Council are that he or she shall be at least eighteen years of age, shall have resided in Western Australia for a minimum of one year, be a natural-born or naturalised British subject, and be enrolled or qualified for enrolment, as an elector. No person may hold office as a Member of the Legislative Council and a Member of the Legislative Assembly at the same time. A Judge of the Supreme Court, the Sheriff of Western Australia, an undischarged bankrupt, a debtor against whose estate there is a subsisting order in bankruptcy, or a person who has been attainted or convicted of treason or felony may not be elected to the Legislative Council. The qualifications for election as a member of the Legislative Council are identical with those necessary for election as a member of the Legislative Assembly. The qualifying age for a candidate for election to either House was reduced from twenty-one years of age to eighteen years of age under the provisions of the *Constitution Acts Amendment Act 1973* which was proclaimed operative from 1 January 1974.

The *Electoral Act 1907-1980* requires that to qualify for enrolment as an elector a person shall be at least eighteen years of age, be a natural-born or naturalised British subject, shall have lived in the Commonwealth of Australia for six months continuously, and shall have lived in Western Australia for three months continuously and in the district for which he claims enrolment for a continuous period of one month immediately preceding the date of his claim. The qualifying age for enrolment as an elector for both the Legislative Council and the Legislative Assembly was reduced from twenty-one years of age to eighteen years of age under the provisions of the *Electoral Act Amendment Act (No. 2) 1970*. The Act operated for the first time at the conjoint election for the Legislative Council and the Legislative Assembly held on 20 February 1971. A person is disqualified from enrolment if he is of unsound mind, has been attainted of treason, has been convicted and is serving sentence for any offence punishable by imprisonment for one year or longer, is the holder of a temporary entry permit for the purposes of the *Migration Act 1958* (Commonwealth) or is a prohibited immigrant under that Act. Enrolment is compulsory under the *Electoral Act Amendment Act 1964* for all qualified persons except those who are Aboriginal natives of Australia. Aborigines, although entitled to enrol, are not required to do so. Voting at elections is on the preferential system and, as provided by the foregoing Act, is compulsory for all enrolled persons.

The *Acts Amendment (Electoral Provinces and Districts) Act 1981* provides that 'until 21 May 1983 the State shall be divided into 16 Electoral Provinces under the Electoral Districts Act 1947 and shall return in all 32 members to serve in the Legislative Council. On and after 21 May 1983 the State shall be divided into 17 Electoral Provinces under the Electoral Districts Act 1947 and shall return in all 34 members to serve in the Legislative Council.'

The Act also provides that 'the State shall be divided into (a) 55 Electoral Districts until the dissolution of the Legislative Assembly or the expiry thereof by effluxion of time first occurring after 31 December 1982; and (b) 57 Electoral Districts thereafter, under the provisions of the Electoral Districts Act 1947, each returning one member to serve in the Legislative Assembly.'

The increase in the number of members of the Legislative Council and the Legislative Assembly to thirty-four and fifty-seven, respectively, will consequently come into effect at the next State elections due to be held early in 1983.

Details of the final recommendations of the Commissioners appointed under the Electoral Districts Act to effect the division of the State into seventeen Electoral Provinces and fifty-seven Electoral Districts were promulgated in the *Government Gazette of Western Australia* dated 20 January 1982. A summary is given below.

ELECTORAL PROVINCES AND ELECTORAL DISTRICTS

Electoral province	Component electoral districts	Electoral province	Component electoral districts
METROPOLITAN AREA			
Metropolitan	Cottesloe Floreat Nedlands Perth Subiaco	South Metropolitan	Cockburn Fremantle Melville Rockingham
North Metropolitan	Joondalup Karrinyup Scarborough Whitford	South Central Metropolitan	Clontarf East Melville South Perth Victoria Park
North Central Metropolitan	Balcatta Balg Mount Lawley Nollamara	South-East Metropolitan	Armadale Canning Gosnells Murdoch
North-East Metropolitan	Ascot Helena Maylands Morley-Swan Welshpool		
AGRICULTURAL, MINING AND PASTORAL AREA			
Central	Avon Merredin Mount Marshall	South-East	Esperance-Dundas Kalgoorlie
Lower Central	Collie Narrogin Warren	South-West	Bunbury Mitchell Vasse
Lower West	Dale Mandurah Murray-Wellington	Upper West	Geraldton Greenough Moore
South	Albany Katanning-Roe Stirling	West	Darling Range Kalamunda Mundaring
NORTH-WEST — MURCHISON-EYRE AREA			
Lower North	Gascoyne Murchison-Eyre	North	Kimberley Pilbara

The composition of the Legislative Council at 30 June 1982 is given in the following table.

MEMBERS OF THE LEGISLATIVE COUNCIL AT 30 JUNE 1982

Name	Political party	Electoral province
DUE TO RETIRE IN 1983 (a)		
Baxter, Hon. Norman Eric	N.C.P.	Central
Dans, Hon. Desmond Keith	A.L.P.	South Metropolitan
Elliott, Hon. Lyla Daphne	A.L.P.	North-East Metropolitan
Ferry, Hon. Victor Jasper, D.F.C.	Lib.	South-West
Griffiths, Hon. Clive Edward	Lib.	South-East Metropolitan
Leeson, Hon. Ronald Thomas	A.L.P.	South-East

MEMBERS OF THE LEGISLATIVE COUNCIL AT 30 JUNE 1982 — *continued*

Name	Political party	Electoral province
McKenzie, Hon. Fred Evan	A.L.P.	East Metropolitan
McNeil, Hon. Thomas	N.P.	Upper West
McNeill, Hon. Neil, B. Sc. (Agric.)	Lib.	Lower West
Moore, Hon. Norman Frederick, B.A., Dip. Ed.	Lib.	Lower North
Oliver, Hon. Oscar Neil Blackburne, E.D.	Lib.	West
Piesse, Hon. Winifred Margaret, J.P.	N.C.P.	Lower Central
Pike, Hon. Robert Gerald	Lib.	North Metropolitan
Williams, Hon. Richard John Lloyd, B.A.	Lib.	Metropolitan
Vacant*	..	North
Wordsworth, Hon. David John	Lib.	South

DUE TO RETIRE IN 1986 (a)

Berinson, Hon. Joseph Max, LL.B.	A.L.P.	North-East Metropolitan
Brown, Hon. James McMillan	A.L.P.	South-East
Dowding, Hon. Peter M'Callum, LL.B.	A.L.P.	North
Gayfer, Hon. Harry Walter	N.C.P.	Central
Hetherington, Hon. Robert, B.A.	A.L.P.	East Metropolitan
Kelly, Hon. Garry Kenneth, B.App. Sc. (Physics)	A.L.P.	South Metropolitan
Knight, Hon. Thomas, A.F.A.I.M., A.A.I.B.	Lib.	South
Lewis, Hon. Alexander Ashley	Lib.	Lower Central
Lockyer, Hon. Philip Harry	Lib.	Lower North
MacKinnon, Hon. Graham Charles, C.M.G.	Lib.	South West
Masters, Hon. Gordon Edgar	Lib.	West
McAleer, Hon. Margaret	Lib.	Upper West
Medcalf, Hon. Ian George, E.D., Q.C.	Lib.	Metropolitan
Pendal, Hon. Phillip George	Lib.	South-East Metropolitan
Pratt, Hon. Ian George	Lib.	Lower West
Wells, Hon. Peter Henry	Lib.	North Metropolitan

A.L.P. = Australian Labor Party. N.C.P. = National Country Party.
 Lib. = The Liberal Party of Australia (Western Australian Division) Incorporated.
 N.P. = National Party. Ind. = Independent.

(a) Section 8 of the *Constitution Acts Amendment Act 1899-1981* provides that a retiring member shall vacate his seat on 21 May in the year of retirement. *Hon. T. G. Stephens, (A.L.P.) was elected at a by-election on 31 July 1982, in succession to the Hon. W. R. Withers, (Lib.) who resigned on 21 May 1982.

The Legislative Assembly

The following table shows the composition of the Legislative Assembly at 30 June 1982.

MEMBERS OF THE LEGISLATIVE ASSEMBLY AT 30 JUNE 1982

Name	Political party	Electoral district
Barnett, Michael	A.L.P.	Rockingham
Bateman, Thomas Henry	A.L.P.	Canning
Bertram, Ronald Edward, A.A.S.A.	A.L.P.	Mt Hawthorn
Blaikie, Barry Roy	Lib.	Vasse
Bridge, Ernest Francis	A.L.P.	Kimberley
Bryce, Malcolm John, B.A.	A.L.P.	Ascot
Burke, Brian Thomas	A.L.P.	Balcatta
Burke, Terence Joseph	A.L.P.	Perth
Carr, Jeffrey Phillip, B.A.	A.L.P.	Geraldton
Clarko, James George, A.E., B.A., Dip. Ed., M.A.C.E., J.P.	Lib.	Karrinyup

MEMBERS OF THE LEGISLATIVE ASSEMBLY AT 30 JUNE 1982 — *continued*

Name	Political party	Electoral district
Court, Richard Fairfax, B.Com.	Lib.	Nedlands
Cowan, Hendy John	N.P.	Merredin
Coyne, Peter Joseph Aloysius	Lib.	Murchison-Eyre
Craig, Hon. Margaret June	Lib.	Wellington
Crane, Albert Victor	N.C.P.	Moore
Dadour, Gabriel Thomas, Dr, M.B., B.S.	Lib.	Subiaco
Davies, Hon. Ronald	A.L.P.	Victoria Park
Evans, Hon. Hywel David, B.A.	A.L.P.	Warren
Grayden, Hon. William Leonard	Lib.	South Perth
Grewar, Geoffrey Royden, B.Sc. (Agric.), J.P.	Lib.	Roe
Grill, Julian Fletcher, LL.B.	A.L.P.	Yilgarn-Dundas
Harman, John Joseph	A.L.P.	Maylands
Hassell, Hon. William Ralph Boucher, LL.B., M.A.	Lib.	Cottesloe
Herzfeld, Thomas Alexander Albert, B.E. (Hons.), (M.I.E.) Aust.	Lib.	Mundaring
Hill, Gordon Leslie	A.L.P.	Swan
Hodge, Barry James	A.L.P.	Melville
Jamieson, Hon. Colin John	A.L.P.	Welshpool
Jones, Hon. Peter Vernon	N.C.P.	Narrogin
Jones, Thomas Henry	A.L.P.	Collie
Laurance, Hon. Ian James, B.A.	Lib.	Gascoyne
MacKinnon, Hon. Barry John, B.Ec., A.A.S.A.	Lib.	Murdoch
McIver, Kenneth Finlay	A.L.P.	Avon
McPharlin, Walter Raymond, J.P.	N.P.	Mt Marshall
Mensaros, Hon. Andrew	Lib.	Floreat
Nanovich, Michael	Lib.	Whitford
O'Connor, Hon. Raymond James	Lib.	Mt Lawley
Old, Hon. Richard Charles	N.C.P.	Katanning
Parker, David Charles, B.A.	A.L.P.	Fremantle
Pearce, Robert John, B.A., Dip. Ed.	A.L.P.	Gosnells
Rushton, Hon. Edgar Cyril	Lib.	Dale
Shalders, Richard Steele	Lib.	Murray
Sibson, John	Lib.	Bunbury
Sodeman, Brian	Lib.	Pilbara
Spriggs, George Clarence Charles	Lib.	Darling Range
Stephens, Matthew Ernest	N.P.	Stirling
Taylor, Hon. Alexander Donald, B.A.	A.L.P.	Cockburn
Taylor, Ian Frederick, B.Ec. (Hons.)	A.L.P.	Kalgoorlie
Thompson, Hon. Ian David	Lib.	Kalamunda
Tonkin, Arthur Raymond, B.A., Dip. Ed.	A.L.P.	Morley
Trethowan, Anthony Markham, B.A., F.A.I.M., F.Inst.D.	Lib.	East Melville
Tubby, Reginald John	Lib.	Greenough
Watt, Leon Harold	Lib.	Albany
Williams, Rex Geoffrey, A.A.I.M.	Lib.	Clontarf
Wilson, Keith James	A.L.P.	Dianella
Young, Hon. Raymond Laurence, F.C.A.	Lib.	Scarborough

SUMMARY

Australian Labor Party (A.L.P.)	23
National Country Party (N.C.P.)	3
National Party (N.P.)	3
The Liberal Party of Australia (Western Australian Division) Incorporated (Lib.)	26

At 30 June 1982 there were fifty-five members of the Legislative Assembly, each member representing one of the fifty-five electoral districts into which the State was divided for the purpose. Members are elected for the duration of the Parliament, which is limited to three years.

A candidate for election must have resided in Western Australia for twelve months, be at least eighteen years of age, be a natural-born or naturalised British subject, and be enrolled or qualified for enrolment as an elector at Legislative Assembly elections. No person is qualified to be a Member of the Legislative Assembly if he is a Member of the Legislative Council, a Judge of the Supreme Court, the Sheriff of Western Australia, an undischarged bankrupt, a debtor against whose estate there is a subsisting order in bankruptcy, or has been attainted or convicted of treason or felony.

The qualifications and disqualifications applying to enrolment as an elector of the Legislative Assembly are the same as those prescribed for electors of the Legislative Council and enumerated in the preceding section *The Legislative Council*. As provided by the *Electoral Amendment Act 1919* enrolment is compulsory for all qualified persons except those who are Aboriginal natives of Australia. Aborigines, although entitled to enrol, are not required to do so. Voting at elections is on the preferential system and is compulsory for all enrolled persons as provided by the *Electoral Act Amendment Act 1936*.

ELECTIONS

The Federal Parliament

General elections for the Federal Parliament were held on 18 October 1980. The Liberal-National Country Party coalition, led by the Honourable J. M. Fraser, was elected to office with a majority of twenty-three seats in the House of Representatives.

Liberal-National Country Party coalition representation in the Senate as a result of the elections was reduced from thirty-five to thirty-one.

The State Parliament

At the conjoint election for the Legislative Council and the Legislative Assembly held on 23 February 1980, the Liberal Party-Country Party alliance, led by the Honourable Sir Charles Court, K.C.M.G., O.B.E., was elected to office with a majority in the Legislative Assembly of nine seats.

LEGISLATION DURING 1981

During the second session of the thirtieth Parliament, which lasted from 19 March 1981 to 8 February 1982, the Western Australian legislature enacted 120 Public Statutes and, in addition, dealt with eight Bills which were introduced but not passed.

The titles and a brief summary of the Acts passed by the State Parliament during 1981 are given below. The full text of the legislation enacted is contained in the volumes of *The Acts of the Parliament of Western Australia*, to which reference should be made if further details are required.

ACTS PASSED DURING 1981

No. of Act	Short title and summary
68	Abattoirs Amendment Act.
13	Acts Amendment (Electoral Provinces and Districts) Act. Amends the <i>Constitution Acts Amendment Act 1899-1980</i> and the <i>Electoral Districts Act 1947-1975</i> .
118	Acts Amendment (Jurisdiction of Courts) Act. Amends the <i>The Criminal Code, the District Court of Western Australia Act 1969-1978</i> and the <i>Local Courts Act 1904-1976</i> .
79	Acts Amendment (Land Use Planning) Act. Amends the <i>Metropolitan Region Town Planning Scheme Act 1959-1980</i> and the <i>Town Planning and Development Act 1928-1980</i> .

ACTS PASSED DURING 1981 — *continued*

No. of Act	Short title and summary
103	Acts Amendment (Lotto) Act. Amends <i>The Criminal Code</i> , the <i>Police Act 1892-1980</i> and the <i>Lotteries (Control) Act 1954-1972</i> .
52	Acts Amendment (Mental Health) Act. Amends the <i>Child Welfare Act 1947-1979</i> , the <i>Convicted Inebriates' Rehabilitation Act 1963-1974</i> , <i>The Criminal Code</i> , the <i>Mine Workers' Relief Act 1932-1980</i> , the <i>Offenders Probation and Parole Act 1963-1980</i> , the <i>Public Trustee Act 1941-1979</i> , the <i>Supreme Court Act 1935-1979</i> , the <i>Uniting Church in Australia Act 1976</i> and the <i>University Medical School, Teaching Hospitals, Act 1955</i> .
69	Acts Amendment (Mining) Act. Amends the <i>Mining Act 1978</i> , the <i>Petroleum Act 1967-1972</i> and the <i>Petroleum (Registration fees) Act 1967</i> .
57	Acts Amendment (Misuse of Drugs) Act. Amends the <i>Child Welfare Act 1947-1979</i> , the <i>District Court of Western Australia Act 1969-1978</i> , the <i>Poisons Act 1964-1978</i> and the <i>Police Act 1892-1980</i> .
116	Acts Amendment (Prisons) Act. Amends <i>The Criminal Code</i> and the <i>Offenders Probation and Parole Act 1963-1980</i> .
63	Acts Amendment (Statutory Designations) and Validation Act. Alters designations of offices and departments in certain Acts and validates acts, matters, and things done by or in relation to those offices and departments under designations other than those applicable to those offices and departments.
106	Acts Amendment (Traffic Board) Act. Amends the <i>Motor Vehicle Drivers Instructors Act 1963-1974</i> , the <i>Motor Vehicle (Third Party Insurance) Act 1943-1976</i> , the <i>Motor Vehicle Dealers Act 1973-1979</i> , the <i>Taxi-cars (Co-ordination and Control) Act 1963-1980</i> , the <i>Transport Act 1966-1981</i> , the <i>Main Roads Act 1930-1980</i> , the <i>Control of Vehicles (Off-road areas) Act 1978</i> and the <i>Stamp Act 1921-1981</i> .
92	Adoption of Children Amendment Act.
76	Agriculture and Related Resources Protection Amendment Act.
53	Animal Resources Authority Act. Establishes the Animal Resources Authority to supply laboratory animals for teaching, research and diagnostic purposes.
112	Appropriation (Consolidated Revenue Fund) Act.
113	Appropriation (General Loan Fund) Act.
67	Architects Amendment Act.
40	Art Gallery Amendment Act.
74	Bills of Sale Amendment Act.
61	Borrowings for Authorities Act. Facilitates the borrowing of moneys by certain semi-government authorities by empowering the Treasurer to borrow moneys for their benefit.
3	Bulk Handling Amendment Act.
95	Bush Fires Amendment Act.
22	Business Franchise (Tobacco) Amendment Act.
82	Business Franchise (Tobacco) Amendment Act (No. 2).
45	Cattle Industry Compensation Amendment Act.
7	City of Perth Endowment Lands Amendment Act.
20	City of Perth Parking Facilities Amendment Act.
5	Clean Air Amendment Act.
83	Collie Coal (Western Collieries & Dampier) Agreement Act. Ratifies an Agreement between the State and Western Collieries & Dampier Pty. Ltd., Western Collieries Ltd. and Dampier Mining Company Limited with respect to the mining, development and rehabilitation of certain coal reserves.
30	Companies (Acquisition of Shares) (Application of Laws) Act. Relates to the application of laws to regulate the acquisition of shares in companies incorporated in Western Australia. Amends the <i>Companies Act 1961-1979</i> .
119	Companies (Application of Laws) Act. Provides for the formation of companies in Western Australia, the regulation of companies formed in Western Australia and the registration in Western Australia of certain other bodies.
32	Companies and Securities (Interpretation and Miscellaneous Provisions) (Application of Laws) Act. Relates to the interpretation of certain provisions dealing with corporations and the securities industry.
110	Consumer Affairs Amendment Act.
97	Country Areas Water Supply Amendment Act.

ACTS PASSED DURING 1981 — *continued*

No. of Act	Short title and summary
104	Country Towns Sewerage Amendment Act.
108	Diamond (Ashton Joint Venture) Agreement Act. Ratifies and authorises the implementation of an Agreement between the State and CRA Exploration Pty. Limited, Ashton Mining Limited, Tanaust Proprietary Limited, A.O. (Australia) Pty. Limited, and Northern Mining Corporation N.L. and CRA Limited relating to the mining, marketing and processing of diamonds.
91	Domicile Act. Abolishes the dependent domicile of married women.
34	Dried Fruits Amendment Act.
100	Education Amendment Act.
58	Explosives and Dangerous Goods Amendment Act.
50	Factories and Shops Amendment Act.
94	Family Court Amendment Act.
73	Fisheries Amendment Act.
17	General Insurance Brokers and Agents Act. Establishes the Insurance Brokers Licensing Board to license and supervise brokers and agents engaged in the transaction of general insurance business.
99	Government School Teachers Arbitration and Appeal Amendment Act.
4	Grain Marketing Amendment Act.
89	Grain Marketing Amendment Act (No. 2).
43	Hospitals Amendment Act.
48	Housing Agreement (Commonwealth and State) Act. Approves and ratifies the 1981 Housing Agreement between the Commonwealth and Western Australia.
11	Industrial Arbitration Amendment Act.
65	Interpretation Amendment Act.
6	Juries Amendment Act.
120	Justices Amendment Act.
23	Law Reporting Act. Constitutes a Law Reporting Advisory Board to regulate the reporting of judicial decisions.
90	Legal Practitioners Amendment Act.
1	Liquefied Petroleum Gas Subsidy Amendment Act.
84	Liquor Amendment Act.
49	Litter Amendment Act.
114	Loan Act. Authorises the raising of \$91 million by loan for the construction of certain public works and for other purposes.
93	Local Courts Amendment Act.
27	Local Government Amendment Act.
24	Local Government Amendment Act (No. 2).
60	Local Government Amendment Act (No. 3).
102	Lotto Act. Provides for the conduct of games of lotto by the Lotteries Commission.
85	Machinery Safety Amendment Act.
21	Marine and Harbours Act. Establishes a Department of Marine and Harbours and defines its functions to provide for the advancement of efficient and safe shipping and effective boating and port administration.
78	Marketing of Lamb Amendment Act.
47	Marketing of Onions Repeal Act. Repeals the <i>Marketing of Onions Act 1938-1965</i> .
28	Medical Amendment Act.
51	Mental Health Act. Makes provision for the care, treatment and protection of mentally ill or intellectually handicapped persons.
77	Metropolitan Market Amendment Act.
41	Metropolitan Water Supply, Sewerage, and Drainage Amendment Act.
72	Metropolitan Water Supply, Sewerage, and Drainage Amendment Act (No. 2).
15	Mining Amendment Act.
2	Mining and Petroleum Research Act. Establishes the Western Australian Mining and Petroleum Research Institute. Promotes and co-ordinates research for the development of the mining and petroleum industries.
62	Ministers of the Crown (Statutory Designations) Amendment Act.
66	Misuse of Drugs Act. Provides a comprehensive and coherent code relating to drugs of addiction, specified drugs and prohibited plants.

ACTS PASSED DURING 1981 — *continued*

No. of Act	Short title and summary
87	Motor Vehicle Dealers Amendment Act.
96	Newspaper Libel and Registration Amendment Act.
29	Noise Abatement Amendment Act.
109	Northern Developments Pty. Limited Agreement Amendment Act.
80	Pay-Roll Tax Assessment Amendment Act.
59	Perth Theatre Trust Amendment Act.
55	Plant Diseases Amendment and Repeal Act. Repeals the <i>Plant Diseases (Registration Fees) Act 1941-1973</i> .
107	Police Amendment Act.
115	Prisons Act. Makes provision for the establishment, management, control and security of prisons, and the custody and welfare of prisoners. Repeals the <i>Prisons Act 1903-1980</i> .
18	Public Moneys Investment Amendment Act.
12	Reserves Act. Alters the purpose of certain reserves and other lands.
117	Reserves Act (No. 2). Alters the purpose of certain reserves.
39	Road Traffic Amendment Act.
71	Road Traffic Amendment Act (No. 2).
105	Road Traffic Amendment Act (No. 4).
25	Rural and Industries Bank Amendment Act.
38	Rural Housing (Assistance) Amendment Act.
31	Securities Industry (Application of Laws) Act. Creates the Securities Industry (Western Australia) Code for the protection of the investor in the securities market through a licensing system and various requirements calling for the disclosure of material information.
35	Seeds Act. Relates to the sale of certain seed.
33	Settlement Agents Act. Constitutes the Settlement Agents Supervisory Board and makes provision for the licensing, regulation and supervision of settlement agents.
75	Small Claims Tribunal Amendment Act.
98	St. Catherine's Hall, Greenough, Act. Vests in The National Trust of Australia (W.A.) portion of Victoria Location 848 and the building situated thereon known as St. Catherine's Hall, Greenough.
81	Stamp Amendment Act.
101	State Energy Commission Amendment Act.
14	State Transport Co-ordination Act. Provides for the co-ordinated planning and advancement of all forms of transport in Western Australia. Repeals the <i>State Transport Co-ordination Act 1966-1980</i> .
9	Superannuation and Family Benefits Amendment Act.
19	Supply Act. Grants supply of \$975 million for the year 1981-82, and \$45 million for the purpose of temporary advances.
46	Trading Stamp Act. Prohibits the use of third-party trading stamps. Repeals the <i>Trading Stamp Act 1948</i> .
8	Transport Amendment Act.
56	Transport Amendment Act (No. 2).
70	Transport Amendment Act (No. 3).
16	Valuation of Land Amendment Act.
54	Veterinary Preparations and Animal Feeding Stuffs Amendment Act.
64	Water Supply, Sewerage, and Drainage Amendment and Validation Act.
10	Western Australian Greyhound Racing Association Act. Establishes the Western Australian Greyhound Racing Association to control, supervise, promote and regulate greyhound racing.
37	Western Australian Institute of Technology Amendment Act.
111	Western Australian Marine (Sea Dumping) Act. Provides for the protection of the environment by regulating the dumping into the sea, and the incineration at sea, of wastes and other matter.
36	Wheat Bags Repeal Act. Repeals the <i>Wheat Bag Act 1928</i> .
42	Wheat Marketing (Delivery Quotas) Amendment and Repeal Act. Repeals the <i>Wheat Delivery Quotas Act 1969-1979</i> and amends the <i>Wheat Marketing Act 1979</i> .

ACTS PASSED DURING 1981 — *continued*

No. of Act	Short title and summary
44	Workers' Compensation Amendment Act.
86	Workers' Compensation and Assistance Act. Amends and consolidates the law relating to compensation for, and the rehabilitation of, workers suffering disability by accident or disease in the course of their employment. Establishes a Workers' Assistance Commission and continues the existence of the Workers' Compensation Board.
88	Workers' Compensation and Assistance (Consequential Amendments) Act. Amends the <i>Workers' Compensation Supplementation Fund Amendment Act 1981</i> .
26	Workers' Compensation Supplementation Fund Amendment Act.

GOVERNMENT ADMINISTRATION

State Government

The Public Service of Western Australia operates under the provisions of the *Public Service Act 1978* and consists of a number of departments established in accordance with the Act. The departments are Aboriginal Affairs Planning Authority, Agriculture, Audit, Chief Secretary's, Community Welfare, Conservation and Environment, Corrections, Crown Law, Education, Electoral, Fisheries and Wildlife, Forests, Hospital and Allied Services, Industrial Development and Commerce, Labour and Industry, Lands and Surveys, Local Government, Marine and Harbours, Mental Health Services, Metropolitan Water Supply, Sewerage, and Drainage Board, Mines, Police, Premier's, Public Health, Public Service Board, Public Works, Resources Development, State Government Insurance Office, State Housing Commission, State Taxation, Tourism, Town Planning, Treasury, Workers' Compensation Board and Youth, Sport and Recreation.

The establishment, abolition or alteration of departments is subject to the approval of the Governor.

Other parts of the State Service normally referred to as Statutory Authorities or Instrumentalities, function under separate Acts although they largely follow the conditions prescribed in the Public Service Act.

Australian Government

A comprehensive guide to the organisation and functions of the Australian Government is given in the *Commonwealth Government Directory*, including an outline of the activities of each Department of State together with similar information concerning Boards, Committees, Councils, Commissions and other Instrumentalities. A list of Australian Government Departments, the principal matters dealt with by each Department, and details of the statutes administered by the relevant Federal Minister are published from time to time in the *Australian Government Gazette* as, for example, in the issue dated 23 December 1981.

HISTORY OF STATE GOVERNMENT DEPARTMENTS

A short but reasonably comprehensive history of State Government Departments was commenced in the 1971 issue of the Year Book. The following article, the twelfth in the series, presents the historical development of the Crown Law Department. Departments dealt with in previous articles were the Public Works Department, the Education Department, the Police Department, the Premier's Department, the Department of Tourism, the Forests Department, the Department of Mines, the Department of Agriculture, the Department of Lands and Surveys, the Department for Community Welfare and the Treasury Department.

CROWN LAW DEPARTMENT

Introduction

Subject to the control of the Attorney-General, the Under Secretary for Law is responsible for the administration of the Crown Law Department. The Department administers the Supreme Court, District Court, Family Court, Magistrates' and Coroners' Courts, the Office of Titles, Public Trust Office, Corporate Affairs Office, Probation and Parole Service and Law Reform Commission. The Department conducts Crown legal business. Through the Crown Solicitor's Office, it acts for and advises other State Government Departments and many instrumentalities, and is responsible for prosecutions for all indictable and many summary offences. The Parliamentary Counsel's Office is responsible for the preparation of legislation.

In the early years, Crown Law was located in the Treasury Building, until it moved to the ground floor of the Supreme Court Building on its completion in 1903. The Head Office is presently located in the Wales Building, St George's Terrace. The position of Under Secretary for Law was created in 1901, the first appointee being Mr H. G. Hampton. The current holder is Mr R. M. Christie. As permanent head, he is responsible to the Attorney-General for the administration of the Department.

On 1 October 1903 the Royal Commission on the Public Service in Western Australia reported that there were seventeen officers in the Department. At 30 September 1982 the corresponding figure was 1,147.

The administration of justice is one of the most important functions of government and the mainstay of law and order. Its beginnings in Western Australia date from the arrival in 1829 of the Lieutenant-Governor, Captain James Stirling, armed with a British Act of Parliament that empowered three or more authorised persons in the colony to make such laws and constitute such courts as may be necessary for the peace, order and good government of His Majesty's subjects and others within the settlement.

The current functions of the Crown Law Department are detailed elsewhere in this Year Book; see *Crown Law Department, Supreme Court, District Court, Family Court, Magistrates' and Coroners' Courts, Probation and Parole Service, Office of Titles, Corporate Affairs Office, Public Trust Office, Law Reform Commission*. These references also contain statistical information relevant to the work of each section. The Department is concerned with the administration of justice and co-ordinates staffing and administration of all the above bodies.

Attorney-General

The *Constitution Act 1889* (which became operative in 1890) was the primary instrument establishing responsible government in Western Australia. Under this Act the position of Attorney-General became elective, along with other ministerial positions. Previously, the Attorney was a salaried officer appointed by the Crown. The title 'Attorney-General' is only applied when the Minister who has responsibility for the Crown Law Department is a lawyer, otherwise he is styled 'Minister for Justice'. The first elected Attorney-General was Mr Septimus Burt in John Forrest's first ministry. The present Attorney-General is the Hon. Joe Berinson, LL.B., M.L.C.

The Courts

In the early years, there was no superior court, however, eight Justices of the Peace were appointed by the Governor. In 1832, a Judicial Department and a Court of Civil Judicature were established.

The Supreme Court, consisting then of one judge only, was established in 1861 with Sir Archibald Paull Burt as Chief Justice. The present court is comprised of the Chief Justice, Sir Francis Burt, seven other judges and the Master.

With the growth in population and commercial activity, specialist courts and tribunals have been established. Only those administered by the Crown Law Department are discussed here.

The role of Justices of the Peace and Magistrates in the administration of summary civil and criminal justice has remained basically the same since the days of the first settlement (see *Magistrates' and Coroners' Courts*).

In 1969 the District Court of Western Australia was created and assumed responsibility for a limited range of civil actions involving sums up to \$6,000 (now \$50,000) and for all claims under Motor Vehicle (Third Party) Insurance legislation. In criminal matters, it has a large, but limited jurisdiction (see *The District Court of Western Australia*).

In 1976 the Family Court of Western Australia was established to handle divorce, custody, guardianship, maintenance, adoption and ancillary matters relating to family law previously handled by the Supreme Court and related Magistrates' Courts.

In 1982, following a Law Reform Commission proposal, a Small Debts Division of the Local Court was created as a means of making the recovery of small debts simpler, quicker and cheaper.

The opening of a new Central Law Courts' Building in St George's Terrace in 1982, was another step in the administration of justice. The building houses the Supreme Court in its criminal jurisdiction, the District Court, and the Perth Local Courts and Courts of Petty Sessions. There is a staff of 300 and between 750 and 900 people per day use the courts. The complex uses Australia's first computer listing system to make the listing of matters for each court easier for litigants to understand. The use of the computer system also facilitates the compilation of necessary statistics.

Public Trust Office

This office consists of the Public Trustee and administrative staff and was established in 1942 to provide a trustee service under Government control and guarantee (see *Public Trust Office*).

Corporate Affairs Office

The first Western Australian Act concerning companies was passed in 1858. Legislation in 1893 created the position of Registrar of Companies. Originally, the Companies Office formed part of the Supreme Court and the Registrar of that court was the Registrar of Companies. In 1960 the offices were separated and the title of Registrar of Companies was changed to Commissioner for Corporate Affairs in 1975. The office (as part of the National Companies and Securities Commission) is responsible for administering company and securities law in Western Australia and is situated in the Public Trust Building.

Office of Titles

On 1 July 1874 the first Transfer of Land Act of Western Australia received the Royal Assent. It signalled the introduction of the 'Torrens System', a system of land title by registration that was simple, cheap and certain. In 1893, an Act was brought into operation with enlarged provisions remedying inadequacies in the original Act.

The first public Office of Titles was located in Barrack Street in the Treasury Buildings. Two small rooms and a cupboard as a strong room comprised the available space. In 1897 the building on the corner of Hay Street and Cathedral Avenue became the permanent office and remained so until 1970 when the office was relocated in Law Chambers on the opposite side of Cathedral Avenue. Parts of the old building are still occupied.

During the land boom of the 1960s, the registration system came under very great pressure and it became apparent that major changes were required. Following recommendations of a firm of business consultants a new registration procedure was instituted on 3 March 1970.

The major legislative measure affecting the operation of the Office of Titles was the *Strata Titles Act 1966*. This Statute provided the means to issue certificates of title for separate parts of a building as lots on a strata plan. The Statute was later extended to include what are known as duplex dwellings. There are now almost 10,000 registered strata plans.

Other Responsibilities

The Offenders Probation and Parole Act (see *Probation and Parole Service*) brought the concepts of probation (1964), parole (1965), and community service orders (1977) into Western Australia for the first time.

The Law Reform Commission was established in 1973 as a means to help the Government keep the law under review. Up to 30 June 1982, it had 80 matters referred to it and had issued 60 reports, 24 of which had resulted in legislation.

THE JUDICATURE

The two major factors in the development of the Australian legal system have been its British origin and the Commonwealth Constitution of 1900. This Statute, an Act of the Imperial Parliament in London, limited the legislative power of State Parliaments in some respects and created a federal legislature. Since 1942, however, the Imperial Parliament can legislate for Australia only at Australia's request. The sources of Australian law of today are, therefore, found in Commonwealth and State legislation, in some Imperial legislation, and in the common law. Independence of the judiciary is an essential part of the Australian legal system.

Listed below are members of the Western Australian judiciary.

	<i>Supreme Court of Western Australia</i>
Chief Justice	The Honourable Sir Francis Burt, K.C.M.G.
Senior Puisne Judge	The Honourable J. L. C. Wickham
Puisne Judges	The Honourable A. R. A. Wallace
	The Honourable P. F. Brinsden
	The Honourable C. H. Smith
	The Honourable G. A. Kennedy
	The Honourable H. W. Olney
	The Honourable W. P. Pidgeon
Master	Mr G. T. Staples
	<i>The District Court of Western Australia</i>
Chairman of Judges	His Honour Judge D. C. Heenan
Judges	His Honour Judge F. Ackland
	His Honour Judge V. J. A. O'Connor
	His Honour Judge I. R. Gunning
	His Honour Judge B. T. O'Dea
	His Honour Judge F. J. Whelan
	His Honour Judge K. J. Hammond
	His Honour Judge G. T. Sadleir
	<i>The Family Court of Western Australia</i>
Chairman of Judges	The Honourable A. J. Barblett
Judges	His Honour Judge I. W. P. McCall
	His Honour Judge D. F. Connor
	His Honour Judge G. E. S. Ferrier
	His Honour Judge D. R. Anderson

Particulars of these and other Western Australian courts, and Commonwealth courts appear in Chapter V, Part 5 and Chapter X, Part 1.

STATE REPRESENTATION OVERSEAS AND IN OTHER STATES

Western Australia has been represented in the United Kingdom by an Agent General since 1892, the first appointment to the post being that of Sir Malcolm Fraser. An Office is maintained at Western Australia House, 115 Strand, London, W.C.2. Its functions include the representation of all Government Departments which have business in Britain and Europe, the purchase of government stores and equipment, the attraction of migrants, the encouragement of overseas

private investment in Western Australia, and the provision of various types of assistance to visitors from Western Australia. In addition, the Office acts as agent for the State Treasury and as a receiving agency for The Rural and Industries Bank of Western Australia. Western Australia's European Public Relations Office and its tourist officer for the United Kingdom and Europe also operate from Western Australia House. The Agent General for Western Australia, Mr R. A. N. Douglas, is the personal representative in Britain of the State Premier.

The State is also represented in Japan, an Office being maintained by the Western Australian Government at Sankaido Building, 9-13 Akasaka, 1-CHOME, Minato-Ku 107, Tokyo.

The Western Australian Department of Tourism has travel centres at Level 2, City Mutual Building, 307 Queen Street, Brisbane, 92 Pitt Street, Sydney, 2 Royal Arcade, Melbourne and 108 King William Street, Adelaide. The managers of the travel centres provide liaison on behalf of Government Departments which have business in these cities.

OVERSEAS REPRESENTATION IN WESTERN AUSTRALIA

There are thirty countries represented in Western Australia by a consular agent, vice-consul, consul, consul-general, or trade representative as follows.

Austria — R. Holmes, Honorary Consul, 21 Howard Street, Perth 6000.

Belgium — S. Drake-Brockman, C.M.G., Honorary Consul, Elder House, 111 St George's Terrace, Perth 6000.

Belgium — L. Baee, Trade Commissioner, St George's Court, 16 St George's Terrace, Perth 6000.

Britain — G. Miles, O.B.E., Consul-General, Prudential Building, 95 St George's Terrace, Perth 6000.

Canada — R. Blake, Consul-General, 7th Floor, 160 St George's Terrace, Perth 6000.

Chile — E. E. Puffe, Honorary Consul, 24 Rosser Street, Cottesloe 6011.

Denmark — J. C. Garnsworthy, Honorary Consul, 17 Phillimore Street, Fremantle 6160.

Finland — R. C. Mattiske, Honorary Consul, 47 Allerton Way, Booragoon 6154.

France — I. H. Hunter, Honorary Consul, 21st Floor, Allendale Square, 77 St George's Terrace, Perth 6000.

France — G. A. Roussilhes, Trade Commissioner, 231 Adelaide Terrace, Perth 6000.

Germany, Federal Republic of — A. E. Blanckensee, Honorary Consul, St George's Court, 16 St George's Terrace, Perth 6000.

Greece — P. Avierinos, Consul, St George's Court, 16 St George's Terrace, Perth 6000.

Guatemala — P. Smetana, Honorary Consul, 28 Warralong Crescent, Mount Lawley 6050.

Honduras — Mrs Eugina Tapero de Newmann, Honorary Consul, 10 Winifred Street, Mosman Park 6012.

Indonesia — W. W. G. Meecham, Honorary Consul, 133 St George's Terrace, Perth 6000.

Ireland — M. Nolan, Honorary Consul, 10 Lilika Road, City Beach 6015.

Italy — G. L. Mascia, Consul, 31 Labouchere Road, South Perth 6151.

Japan — Y. Ota, Consul-General, 8th Floor, Commonwealth Bank Building, 150 St George's Terrace, Perth 6000.

Lesotho, United Kingdom of — R. G. Popham, Honorary Consul, 14 Allen Street, South Perth 6151.

Malaysia — Hussin Bin Hamid, Consul, 15th Floor, Allendale Square, 77 St George's Terrace, Perth 6000.

Netherlands — T. C. Dercksen, Honorary Consul, 111 St George's Terrace, Perth 6000.

New Zealand — M. J. McLean, Consul, St George's Court, 16 St George's Terrace, Perth 6000.

Norway — P. G. Lynn, Honorary Consul, 11 Cliff Street, Fremantle 6160.

Philippines — G. V. Mummery, Honorary Consul-General, 451 Murray Street, Perth 6000.

Portugal — F. Correia, Honorary Vice-Consul, 245 South Terrace, South Fremantle 6162.

Seychelles — G. F. Robert, Honorary Consul, 271 Canning Road, Lesmurdie 6076.

Spain — A. Quintela, Honourary Vice-Consul, 130 William Street, Perth 6000.

Sweden — H. Morgan, Honorary Consul, Market House, 849-51 Wellington Street, Perth 6000.

Switzerland — R. H. Abplanalp, Honorary Vice-Consul, 29 Marie Way, Kalamunda 6076.

Thailand — Brigadier W. D. Jamieson, R.L., Honorary Consul-General, 135 Victoria Avenue, Dalkeith 6009.

United States of America — Miss M. C. Carbone, Consul, Scottish Amicable Building, 246 St George's Terrace, Perth 6000.

Yugoslavia — D. Jovic, Consul, 24 Colin Street, West Perth 6005.

In addition, the Grand Duchy of Luxembourg is represented in Western Australia by the Consul for Belgium. Liechtenstein is represented by the Vice-Consul for Switzerland. For Britain and the Federal Republic of Germany the respective trade representatives are part of the consular staff located at their respective embassies listed above.

THE LOCAL GOVERNMENT SYSTEM

The function of local government in Western Australia is performed by a number of Councils (or, in special circumstances, by Commissioners appointed by the Governor) exercising powers conferred by the Parliament of the State. Each of the Councils consists of members elected by a local community and is responsible for the provision of many of the services necessary for the organisation and welfare of the community which it represents.

As early as 1838 an Act providing a measure of local government was passed and under its provisions the management and control of the town of Perth was vested in a body of trustees. The first elected Town Trust was constituted at Perth in 1842 under an Act of 1841 for the 'Improvement of Towns in Western Australia'. The trust was dissolved in 1858 and replaced by a City Council, the town of Perth having been constituted a city when it became the seat of a Bishop in 1856.

Legislation was enacted in 1871 establishing Municipalities and Road Boards throughout the Colony. The existing Statute regulating the operations of the local authorities is the *Local Government Act 1960-1981*, which is administered through a Department of Local Government by the Minister for Local Government. This Act consolidates the law relating to local government in Western Australia, and by its provisions the Municipal Corporations Act, the Road Districts Act and a number of other, less important, Acts were repealed. The legislation came into operation on 1 July 1961 and from that date new designations were applied to many local government districts, bodies and offices. Former Municipalities, other than Cities, became known as 'Towns' and Road Districts were renamed 'Shires'. Municipalities which already had city status remained 'Cities'. The executive body in each local government district became a 'Council', City Councils and Town Councils being presided over by a Mayor, and Shire Councils by a President. The chief non-elective executive office of a City or a Town is that of 'Town Clerk' and of a Shire, that of 'Shire Clerk'.

At 31 December 1981 there were 12 Cities, 12 Towns and 114 Shires in Western Australia.

Local Government Districts

The only unincorporated area in mainland Western Australia is Kings Park, a public reserve of about 403 hectares in Perth, all other land being incorporated within the district of a City, Town or Shire.

On presentation of a petition signed by a prescribed minimum number of ratepayers, the number varying with the subject matter, the Governor may by Order constitute any part of the

State as a Town; constitute as a new Shire any part of an existing Shire; divide a Shire into two or more Shires; sever portion of a district and annex the portion to an adjoining district, or constitute the portion as a new Town or Shire; divide a district into wards; or abolish a district and dissolve the local governing authority. In some cases the ratepayers of a district have the right to demand that a poll be held on the question of boundary changes.

The Act establishes a Local Government Boundaries Commission of three members, one being an officer of the Department of Local Government, who is Chairman of the Commission. The other members must be persons having experience in local government and nominated by associations of local government authorities. The Minister may refer to the Commission any question concerning the constitution or alteration of the constitution of local government districts. Every case where authorities are unable to agree on a matter of amalgamation or severance of territory must be referred to the Commission.

On the petition of the local authority concerned, the Governor may by Order declare to be a City any district which satisfies certain specified requirements. These requirements are that, during the three years immediately preceding the declaration, it shall have maintained a population of not less than 30,000 persons if situated in the metropolitan area as declared for the purposes of the Act, or not less than 20,000 persons if situated outside that area; and have maintained a gross revenue of \$200,000 for each of the three years. In addition the district must be clearly distinguishable as a centre of population having a distinct civic centre with adequate halls and cultural facilities, and must have sufficient residential, commercial and industrial centres to justify its declaration as a separate city. Of the twelve Cities in Western Australia, eleven are situated in the Perth Statistical Division, with Bunbury being the first country city. There had been five cities granted city status before the requirements imposed by the present legislation became operative. These five Cities are Perth (proclaimed in 1856), Fremantle (1929), Subiaco (1952), Nedlands (1959), and South Perth (1959). Having satisfied the requirements for city status provided by the Local Government Act the Town of Melville was declared a city on 3 May 1968, the Shire of Perth was redesignated the City of Stirling with effect from 24 January 1971 and the Town of Gosnells was declared a city on 1 July 1977. In addition the following areas were declared cities in 1979: the Shire of Belmont, 17 February; the Town of Canning, 10 March; the Town of Bunbury, 8 October and the Town of Cockburn, 26 October.

The boundaries of local government districts as they existed at 30 June 1982 are delineated on the maps of the State inside the back cover and the names and designations as at that date are given in the lists at the end of this Chapter.

Constitution and Electoral Provisions

The provisions of the Local Government Act relating to the composition of a Council require that the minimum number of members be five with no limit set for the maximum number.

Two methods of election to the office of Mayor or of President are prescribed. In the case of a City or Town, election is usually by a poll of the electors enrolled for the district. The President of a Shire is usually elected by the councillors from among their own number. It is provided, however, that a City or Town may adopt the system of election of the Mayor by the councillors, and that a Shire may conduct a poll of its electors for election to the office of President. The question of the adoption of the alternative system must, in all cases, be determined by submission to a poll of the electors, after delivery to the Mayor or the President of a resolution of a majority of the councillors or a petition signed by one-tenth of the electors, or by fifty electors, whichever is the greater. If not less than 15 per cent of eligible electors vote at the poll and a majority of the valid votes cast are in favour of the proposed alteration, the Governor shall order its adoption.

The Act constitutes the office of Deputy Mayor, in the case of a City or a Town, and of Deputy President in the case of a Shire, and requires that the Council shall elect one of the councillors to the office.

Provision is made for local government elections to be held on the fourth Saturday in May of each year but in specified circumstances the Governor may, by proclamation, appoint a Saturday in May, earlier than the fourth Saturday, to be the election date. Voting is not compulsory. Membership of a Council is elective in all cases, the qualified electors being adult natural-born or naturalised British subjects who own or occupy rateable land in the district. The preferential system of voting is used and representation is generally on the basis of wards into which the district may be divided. Prior to the 1982 annual elections plural voting applied, an elector being entitled, in accordance with the rateable value of the property owned or occupied by him, to a number of votes which might not, however, exceed four in elections for Mayor or President, or two in elections for councillor. The Act contains provisions enabling nominees of corporations owning land in a district to vote at local government elections and to be elected to membership of the Council. Amended voting provisions under the *Local Government Amendment Act 1981* entitle an elector to a maximum of two votes in any given ward, either in a personal capacity or as a corporation nominee. Subject to disqualification on certain specified grounds, all adult persons who are natural-born or naturalised British subjects owning or occupying rateable land within the district are eligible for election to the Council of the district whether as Mayor, President or councillor, provided that in the case of occupiers their names appear on the Council's electoral roll.

The term of office of a Mayor or a President is two years if elected by the electors of the district, or one year if elected by the Council. Councillors are elected for a term of three years, as near as practicable to one-third of their number retiring each year. On the expiration of their term of office all members, including the Mayor and the President, are eligible for re-election if not subject to any of the disqualifications contained in the Act.

It is provided that, if in a particular district there should at any time be no Council or insufficient councillors to form a quorum, a Commissioner may be appointed to exercise all the powers of the local authority.

Functions of Local Authorities

The functions and powers of local authorities are extremely diverse in character. They are prescribed in detail in the Local Government Act and some of the more important of them are referred to in later Chapters of the Year Book. For example, reference to local government activity in the fields of road construction and maintenance will be found in Chapter VI, Part 1 and Chapter IX, Part 3; the provision of parks, gardens and recreation grounds in Chapter V, Part 2; libraries in Chapter V, Part 2; public transport facilities in Chapter IX, Part 3; water supplies in Chapter VII, Part 2; town planning and building control in Chapter VII, Part 3; and the licensing of vehicles in Chapter IX, Part 3. Among the many other powers of local authorities are those relating to hospitals and nursing services, kindergartens, hostels for school children, community centres, dental clinics, infant and maternal health centres, day nurseries, control of dogs, jetties, swimming pools, sanitation and disposal of refuse, fire prevention, eradication of noxious weeds and vermin, electricity generation, aerodromes, abattoirs, quarries, pounds and cemeteries. Under the provisions of the Health Act local authorities are responsible for certain aspects of health administration.

The operations of any local government authority may be subject to investigation by a person appointed by the Governor or the Minister and having, for the purposes of the inquiry, the powers of a Royal Commission.

Financial Provisions

Local government authorities have four major sources of finance. They are moneys received from rates, loans, government grants and personal income tax entitlements. Financial

powers of local authorities, although derived mainly from the Local Government Act, are also provided by other Statutes, including the Health Act, the Fire Brigades Act, the Cemeteries Act, and the Library Board of Western Australia Act.

Rates. The general rate for a local government district in any year is determined by dividing the sum required to make up the difference between anticipated expenditure and estimated revenue from sources other than rates for that year by the total value of rateable property in the district. However, a Council may impose a rate which would yield less than the amount required to balance its budget, subject to approval by the Minister. In assessing the value of rateable property, every local authority must adopt valuations made by the Valuer-General under the provisions of the *Valuation of Land Act 1979*. The *Land Valuation Tribunals Act 1978* provides for the constitution of Land Valuation Tribunals, to which appeals may be made on matters concerning valuations of property.

Valuations may be on the basis of either 'unimproved value' or 'gross rental value'. The unimproved value generally represents the price which the rated land might be expected to realise if sold on the open market and, as the term implies, excludes any improvements. The gross rental value is an estimate of the gross rental value of the property including improvements. Generally, City Councils and Town Councils are required to assess the general rate on the basis of gross rental value, and Shire Councils on unimproved value. It is provided, however, that any Council may, under certain specified conditions, adopt the alternative basis. Although in general a Council is required to levy a rate which is uniform throughout its district, it may differentiate in rating by charging a higher rate in a specified area where expenditure, including loan interest and repayments, is incurred in providing special services for the benefit of that area. Councils may charge a penalty on unpaid rates. The prescribed maximum percentage in applying an interest penalty is 10 per cent.

Loans. Local authorities are authorised to raise loans for works and undertakings and for the liquidation of existing loan debts. A Council may, with the written consent of the Minister obtain advances from a bank for a budget deficiency, for the installation of sewerage connections and septic tanks, and for other work approved by the Governor. With the written permission of the Minister a Council may also borrow from a permanent building society to enable it to acquire or develop land for the purpose of subdivision into residential lots. Money may also be borrowed by the sale of debentures, repayment being either by the system of reducible principal or by means of a sinking fund. Payments to debenture holders are made at prescribed intervals. Under the system of reducible principal, the local authority undertakes to pay both principal and interest by fixed instalments. Where redemption is by means of a sinking fund, the local authority is required to establish and maintain the necessary fund at the State Treasury. Interest on the loan is normally paid half-yearly and the full amount of the loan is repaid at maturity.

The extent of loan raisings for works and undertakings is controlled by a provision which, except with the specific approval of the Governor, imposes a limit on the borrowings of an authority. The total amount of loans for which a Council may be indebted at any one time is a sum equal to ten times the amount obtained by subtracting from the average of the ordinary revenue of the authority during the preceding two years the average, for the same period, of its annual expenditure on the servicing of loans. The legislation allows that balances standing to the credit of sinking funds for loan repayment, as well as amounts actually repaid, may be deemed to be repayments for purposes of calculating net total debt. In the case of borrowings to liquidate existing loans, it is provided that the money raised shall not exceed the outstanding balance of the loan.

Before a loan may be raised by the issue of debentures, approval of the borrowing must be obtained from the State Treasury and the local authority must then publish in a newspaper and in the *Government Gazette of Western Australia* a notification of its intention to borrow money,

including a statement of the amount of the proposed loan, its purpose and other relevant matters. Except in the case of a loan to liquidate an existing loan debt, the ratepayers of the district may demand that the proposition be submitted to a poll. If less than 15 per cent of the ratepayers vote at the poll, or a majority of the votes are in favour of the loan, the raising of the loan is approved.

Certain of the works and undertakings for which loan moneys may be used are specified in the Local Government Act. They include the construction of streets, roads and bridges, sewers, drains and water works; the erection or purchase of electric lighting plant, gas works and stone quarries; the provision of hostels for school children, libraries and other recreational facilities; the construction of civic and other buildings; and the purchase of land, materials and equipment. Where a particular work or undertaking is not specified in the Act the Governor may approve of it as a project for which money may be borrowed.

Government Grants. Government grants constitute an important source of revenue for local government authorities. These are mainly specific purpose payments for road works, further details of which are provided in Chapter IX, Part 3 — Transport, *Finance for Roads*.

Personal Income Tax Entitlements. The *Local Government (Personal Income Tax Sharing) Act 1976* requires each State to allocate not less than 30 per cent of the funds among local government authorities on a population basis, but account may also be taken of the area of the authority, population density or any other matter agreed upon between the Commonwealth and the State. The remaining funds are to be allocated having regard to the special needs and disabilities of local authorities.

State legislation constituting the Western Australian Local Government Grants Commission became effective on 11 May 1978, under the authority of the *Local Government Grants Act 1978*. The Act prescribes that 80 per cent of the State's entitlement be distributed on primarily a population basis. The Minister has discretion to vary this percentage, subject to the requirement that not less than 30 per cent of the funds are distributed on that basis. The remaining 20 per cent of the funds are to be allocated upon the recommendations of the Local Government Grants Commission according to the special needs of local government authorities. The Minister is empowered to request the Commission to review its recommendations. In such circumstances, the Commission shall re-submit its recommendations to the Minister with, or without amendment.

General. The financial transactions of local government authorities are subject to annual audit either by an auditor (or auditors) appointed by the Council or by the Auditor-General or persons appointed by him. To qualify for the office of auditor, a person must be a member of a specified institute or society of accountants and be registered as an auditor under the Companies Act. Appointment is for a term not exceeding two years, at the end of which time the holder of the office is eligible for reappointment.

The financial year for all Councils ends on 30 June.

Details of the revenue and expenditure of local authorities during the five-year period ending with the financial year 1979-80 are given in the section *Local Government Finance* in Chapter VI, Part 1.

STATISTICAL DIVISIONS

The local government districts are used as the basis of presentation of data derived not only from the population census but also from many of the regular statistical collections. Information presented in this way is valuable when considering activities in particular local government areas but is often more detailed than is required for a broader geographical assessment. For this reason, the local government districts are combined into statistical divisions which provide significant areas for the publication of statistics in a convenient summary form.

The partition of the Australian States into statistical divisions originated from a resolution of a conference of 1928 between the Federal Health Council of Australia and the Statisticians of the Commonwealth and the States concerning the need for the delineation of areas appropriate for the purposes of statistical tabulation. They first became operative in 1929 after consultation between the Australian Statistician, the Statisticians of the States in collaboration with the State health authorities, and the Commonwealth Department of Health. Although statistical divisions were devised initially for use in the compilation and presentation of vital statistics, the advantages of extending the system to other fields of statistical investigation were recognised at once and it soon came to have general application in cases where consideration of geographic areas was relevant.

LIST OF STATISTICAL DIVISIONS with component Local Government Areas at 30 June 1982

(Statistical divisions are indicated thus: *SOUTH-WEST*; sub-divisions thus: *BLACKWOOD*; local government areas thus: Manjimup. Cities are marked (C) and Towns (T), all other government areas being Shires.)

PERTH

CENTRAL METROPOLITAN

Claremont (T)
Cottesloe (T)
Mosman Park (T)
Nedlands (C)
Peppermint Grove
Perth (C)
Subiaco (C)

EAST METROPOLITAN

Bassendean (T)
Bayswater
Kalamunda
Mundaring
Swan

NORTH METROPOLITAN

Stirling (C)
Wanneroo

SOUTH-WEST METROPOLITAN

Cockburn (C)
East Fremantle (T)
Fremantle (C)
Kwinana (T)
Melville (C)
Rockingham

SOUTH-EAST METROPOLITAN

Armadale (T)
Belmont (C)
Canning (C)
Gosnells (C)
Serpentine-Jarrahdale
South Perth (C)

SOUTH-WEST

MURRAY

Mandurah
Murray
Waroona

PRESTON

Bunbury (C)
Capel
Collie
Dardanup
Donnybrook-Balingup
Harvey

VASSE

Augusta-Margaret River
Busselton

BLACKWOOD

Boypup Brook
Bridgetown-Greenbushes
Manjimup
Nannup

LOWER GREAT SOUTHERN

PALLINUP

Broomehill
Gnowangerup
Katanning
Kent
Kojonup
Tambellup
Woodanilling

KING

Albany (T)
Albany
Cranbrook
Denmark
Plantagenet

UPPER GREAT SOUTHERN

WILLIAMS

Boddington
Brookton

WILLIAMS — *continued*

Cuballing
Dumbleyung
Narrogin (T)
Narrogin
Pingelly
Wagin
Wandering
West Arthur
Wickepin
Williams

LAKES

Corrigin
Kondinin
Kulin
Lake Grace

MIDLANDS

MOORE

Chittering
Dandaragan
Gingin
Moora
Victoria Plains

AVON

Beverley
Cunderdin
Dalwallinu
Dowerin
Goomalling
Koorda
Northam (T)
Northam
Quairading
Tammin
Toodyay
Wongan-Ballidu
Wyalkatchem
York

LIST OF STATISTICAL DIVISIONS**with component Local Government Areas at 30 June 1982 — *continued***

(Statistical divisions are indicated thus: *SOUTH-WEST*: sub-divisions thus: *BLACKWOOD*: local government areas thus: Manjimup. Cities are marked (C) and Towns (T), all other government areas being Shires.)

*MIDLANDS — continued***CAMPION**

Bruce Rock
Kellerberrin
Merredin
Mount Marshall
Mukinbudin
Narembeen
Nungarin
Trayning
Westonia
Yilgarn

*SOUTH-EASTERN***LEFROY**

Boulder
Coolgardie
Kalgoorlie (T)
Laverton
Leonora
Menzies

DUNDAS

Dundas
Esperance
Ravensthorpe

*CENTRAL***GASCOYNE**

Carnarvon
Exmouth
Shark Bay
Upper Gascoyne

CARNEGIE

Cue
Meekatharra
Mount Magnet
Murchison
Sandstone
Wiluna
Yalgoo

GREENOUGH

Carnamah
Chapman Valley
Coorow
Geraldton (T)
Greenough
Irwin

GREENOUGH — continued

Mingenew
Morawa
Mullewa
Northampton
Perenjori
Three Springs

*PILBARA***DE GREY**

East Pilbara
Port Hedland

ASHBURTON

Roeburne
West Pilbara

*KIMBERLEY***ORD**

Halls Creek
Wyndham-East Kimberley

FITZROY

Broome
West Kimberley

CHAPTER IV — POPULATION AND VITAL STATISTICS

Part 1 — Population

The State of Western Australia, although comprising almost one-third of the total area of Australia, contains only about one-eleventh of the population.

At the end of 1829, the year of establishment of the Colony, there were 1,000 persons in Western Australia. Progress in the early years was slow, and in 1849 the population was still less than 5,000. Transportation of convicts, begun in the following year, resulted in some acceleration, but it was not until the discovery of gold in the Kimberley in 1885 and the rich finds at Coolgardie in 1892 and at Kalgoorlie in 1893 that any marked increase took place. This development was so rapid that, in the last decade of the century, the population was almost quadrupled, from 48,500 at the end of 1890 to 180,000 in 1900, representing an average annual rate of increase of 14.01 per cent. The rate of growth in those years has never been approached in the present century, but the average annual rate of increase of Western Australia's population from the Census of 1901 to March 1981, 2.46 per cent, has been higher than that of any other State and of Australia as a whole (1.73 per cent).

THE CENSUS

While counts of the population were conducted in earlier years, the first systematic census of the Colony of Western Australia was taken in 1848, since when there have been sixteen enumerations, at the dates shown in the first table in this Part. The Census of 1881 was the first taken simultaneously in all the Australian Colonies and formed part of the first simultaneous census of the British Empire.

The first census of the Commonwealth of Australia conducted under the authority of the *Census and Statistics Act* 1905 was taken in 1911. The Act provided that a census should be taken in that year 'and in every tenth year thereafter'. In 1930 this provision was amended by the addition of the words 'or at such other time as is prescribed'. The depressed economic conditions of 1931 caused the postponement of the third Australian census to 1933, and because of war conditions the fourth Australian census was not taken until 1947. Consideration was then given to holding future censuses in the series of years originally provided for by the Act. However, it was thought that the interval from 1947 to 1951 was too short, and it was therefore decided to take the fifth census in 1954, at the mid-point of the period from 1947 to 1961. The sixth census was held in 1961. Since 1961 censuses have been conducted at five-yearly intervals. In 1977 the Census and Statistics Act was further amended to read 'in the year 1981 and in every fifth year thereafter, and at such other times as are prescribed'.

Scope of the Census

The Australian census records the population actually in Australia, persons being enumerated at the place where they spent the night of the census, and the population so recorded being credited in census tabulations to that place whether or not it is the usual place of residence.

The census covers the population of Australia and the dwellings in which it lives. The only persons excluded from the census tabulations are diplomatic representatives of overseas countries and their families and staffs having diplomatic immunity in accordance with international practice. Prior to the Census of 30 June 1971 full-blood Australian Aborigines were also excluded.

Aborigines. Before an amendment to the Commonwealth Constitution in 1967, it was provided by section 127 that 'in reckoning the numbers of the people of the Commonwealth, or of a State or other part of the Commonwealth, aboriginal natives shall not be counted'. This provision was deleted following a referendum held on 27 May 1967 which resulted in a large majority of votes in favour of its repeal. The enabling Act, the *Constitution Alteration (Aboriginals)* 1967, came into operation on 10 August 1967.

With regard to the original provision, Commonwealth legal authorities were of the opinion that persons of the half-blood were not 'aboriginal natives' within the meaning of the Constitution, and *a fortiori* that persons of less than half Aboriginal blood were not Aboriginal natives. Accordingly, only persons having Aboriginal blood to a degree greater than one-half were excluded from the census tabulations. Dwellings occupied solely by full-blood Aborigines so defined were similarly excluded.

Under-enumeration

Post-enumeration surveys, which are designed to measure the degree of error in a census, were conducted after the 1971, 1976 and 1981 Censuses, by specially trained interviewers. Net under-enumeration was derived by comparing results from the Census and the post-enumeration survey for the same individuals, and identifying omissions and duplications in the Census.

While every effort is made to minimise under-enumeration in the Census, some inevitably remains for various reasons (e.g. inadvertent omission of very young children, treatment by the collector of an occupied dwelling as unoccupied). Refusal by householders to complete the Census Schedule is not considered to be a significant cause of under-enumeration, as estimates by the collector are used in such cases.

The 1981 post-enumeration survey was based on a sample size of $\frac{2}{3}$ per cent of households, as it was for 1976. This sample size was chosen to provide reliable data on the characteristics (e.g. sex, age) of omitted persons. Under-enumeration in Western Australia, as measured by the survey, was 2.7 per cent in 1976 and 1.9 per cent in 1981.

Persons living in non-private dwellings (e.g. hotels, motels, hospitals) and sparsely settled areas are excluded from post-enumeration surveys because of operational difficulties in conducting follow-up interviews. However, these amount only to about 5 per cent of the population and hence any under-enumeration of them is unlikely to have a significant effect on the total level of under-enumeration.

Adjustments have been made to the Australian and State totals for numbers of males and females at the 1971 Census as well as to total population for capital city divisions. In addition, for the 1976 and 1981 Censuses, adjustments have been made to the numbers at each age at the Australian and State levels and to total population at the local government area level.

The 1981 Census

Processing of the 1981 Census data was completed in June 1982. In order to prevent the inadvertent release of identifiable information slight adjustments have been made to some data produced in the more detailed tabulations. Hence totals may be slightly greater or less than the sum of their components. Further information is contained in the publication *Effects of Introduced Random Error* (Catalogue No. 2156.0) issued by the Australian Statistician, Canberra.

Population at each Census

The population of Western Australia at each census date from 1848, its relation to the Australian population, and the masculinity are shown in the following table.

The masculinity of the Australian population at the three latest censuses was 101.06 in 1971, 100.44 in 1976 and 99.63 in 1981.

POPULATION AT EACH CENSUS DATE — 1848-1981 (a)
WESTERN AUSTRALIA AND AUSTRALIA

Date of census	Western Australia			Western Australia		
	Western Australia			Australia	Proportion of	
	Males	Females	Persons	Persons (b)	Australia (per cent)	Masculinity (c)
1848 — 10 October	2,818	1,804	4,622	326,500	1.42	156.21
1854 — 30 September	7,779	3,964	11,743	671,500	1.75	196.24
1859 — 31 December	9,522	5,315	14,837	1,097,000	1.35	179.15
1870 — 31 March	15,375	9,410	24,785	1,606,000	1.54	163.39
1881 — 3 April	17,062	12,646	29,708	2,250,194	1.32	134.92
1891 — 5 April	29,807	19,975	49,782	3,177,823	1.57	149.22
1901 — 31 March	112,875	71,249	184,124	3,773,801	4.88	158.42
1911 — 3 April	161,565	120,549	282,114	4,455,005	6.33	134.02
1921 — 4 April	177,278	155,454	332,732	5,435,734	6.12	114.04
1933 — 30 June	233,937	204,915	438,852	6,629,839	6.62	114.16
1947 — 30 June	258,076	244,404	502,480	7,579,358	6.63	105.59
1954 — 30 June	330,358	309,413	639,771	8,986,530	7.12	106.77
1961 — 30 June	375,452	361,177	736,629	10,508,186	7.01	103.95
1966 — 30 June	432,569	415,531	848,100	11,599,498	7.31	104.10
1971 — 30 June	539,332	514,502	1,053,834	13,067,265	8.06	104.83
1976 — 30 June	599,959	578,383	1,178,342	14,033,083	8.40	103.73
1981 — 30 June p	656,403	642,691	1,299,094	14,926,786	8.70	102.13

(a) Figures for 1961 and earlier exclude full-blood Aborigines; those for 1966 and later refer to total population (i.e. including Aborigines). Figures for 1966 and earlier refer to census counts; those for 1971 and later refer to estimated resident population. (b) Figures for dates prior to 3 April 1881 are estimates. (c) Number of males to each 100 females.

Characteristics of the Population

Age. The following table shows the numbers and proportions of the population of Western Australia in selected age groups at each census from 1961 to 1981. The age groups have been chosen as representing, in a general sense, such sectors as the pre-school population, children of school age, minors, the economically active population, and those beyond normal working age.

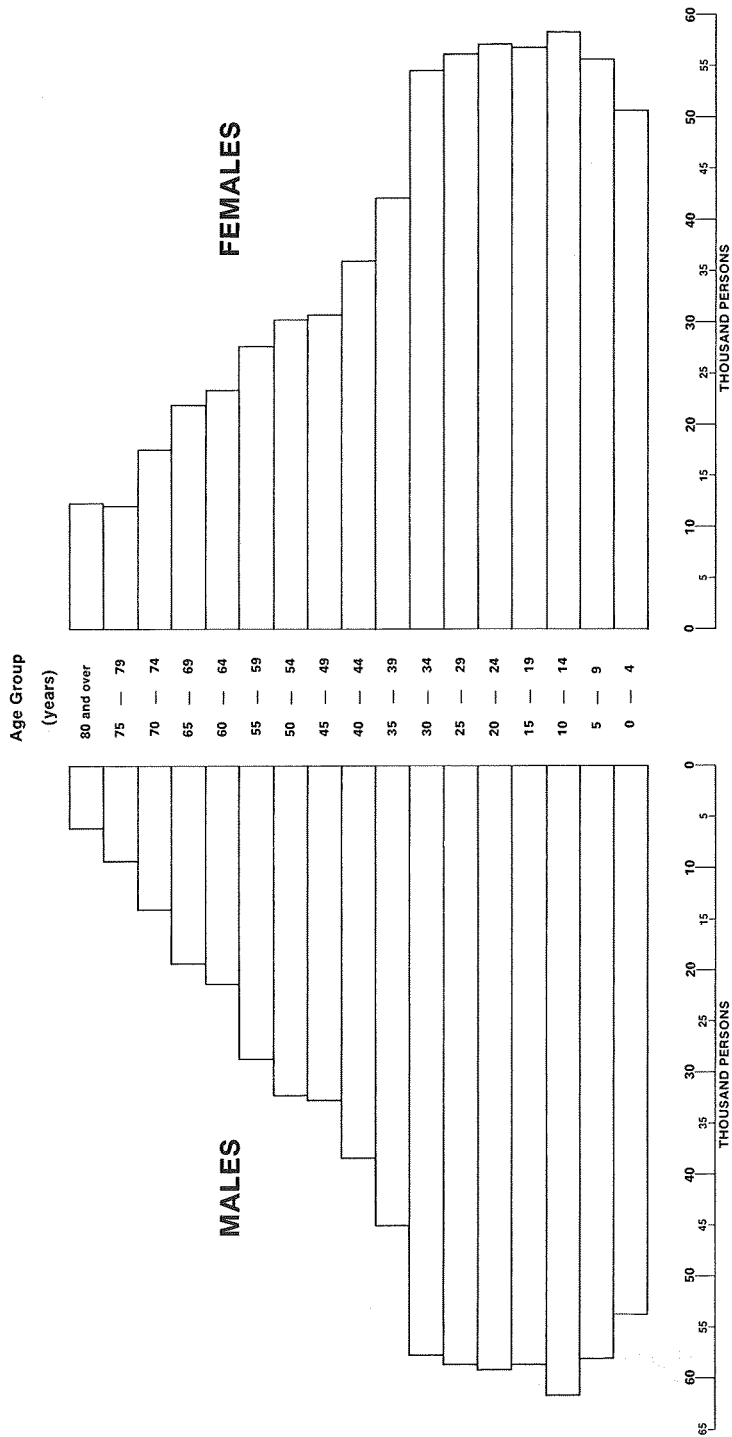
POPULATION IN SELECTED AGE GROUPS (a) — CENSUSES, 1961 TO 1981
(PERSONS)

Age last birthday (years)	Number in each age group					Per cent of total				
	Census, 30 June —					Census, 30 June —				
	1961	1966	1971	1976	1981 p	1961	1966	1971	1976	1981 p
Under 6	98,447	104,984	127,355	132,088	125,828	13.36	12.38	12.08	11.21	9.70
6 — 12	110,438	125,498	150,108	154,666	166,346	14.99	14.80	14.24	13.13	12.80
6 — 15	153,294	176,627	211,987	223,441	234,879	20.81	20.83	20.12	19.00	18.08
Under 18	276,182	313,316	377,620	399,794	406,647	37.49	36.94	35.83	33.93	31.30
Under 21	307,473	356,913	432,916	462,691	477,227	41.74	42.08	41.08	39.27	36.74
15 — 44	293,882	353,971	466,942	539,810	620,912	39.90	41.74	44.31	45.81	47.80
15 — 64	441,821	518,202	656,806	752,211	848,129	59.98	61.10	62.33	63.84	65.29
65 and over	55,097	65,129	78,225	93,751	112,980	7.48	7.68	7.42	7.96	8.70
All ages	736,629	848,100	1,053,834	1,178,342	1,299,094	100.00	100.00	100.00	100.00	100.00

(a) See footnote (a) to previous table.

Birthplace; Religion. The birthplace and religion of the population as recorded at the Censuses of 1976 and 1981 are shown in the following table. The Census and Statistics Act provides that there shall be no penalty for failure to answer the question on religion, and a statement to this effect is contained in the census schedule.

Estimated Resident Population, by Age Group: 30 June 1981.



BIRTHPLACE AND RELIGION OF THE POPULATION (a) CENSUSES 1976 AND 1981

Particulars	Census, 30 June 1976				Census, 30 June 1981			
	Males	Females	Persons	Per cent of total	Males	Females	Persons	Per cent of total
BIRTHPLACE								
Australia	'000	'000	'000		'000	'000	'000	
Europe —	417.1	415.3	832.4	72.71	454.2	456.8	911.0	71.53
United Kingdom and Eire	90.8	85.8	176.6	15.43	94.8	91.3	186.1	14.62
Other	45.0	37.0	81.9	7.15	46.1	38.6	84.7	6.65
Total, Europe	135.8	122.8	258.6	22.58	140.9	129.9	270.9	21.28
Asia	15.1	14.2	29.3	2.56	18.6	19.0	37.6	2.95
Other countries	13.2	11.3	24.6	2.15	21.1	18.8	39.9	3.13
GRAND TOTAL (b)	581.2	563.7	1,144.9	100.00	643.1	630.5	1,273.6	100.0
RELIGION								
Christian —	'000	'000	'000		'000	'000	'000	
Baptist	7.1	7.3	14.4	1.26	7.6	8.2	15.9	1.25
Catholic, Roman Catholic	141.5	141.8	283.2	24.74	156.6	159.8	316.3	24.84
Church of England	177.4	182.9	360.3	31.47	183.4	192.4	375.8	29.51
Churches of Christ	5.7	6.8	12.6	1.10	6.5	7.7	14.2	1.11
Methodist	36.9	40.1	77.0	6.73	24.5	26.7	51.2	4.02
Presbyterian	20.9	21.8	42.6	3.72	15.3	16.8	32.0	2.52
Other	41.4	43.6	85.0	7.43	63.1	68.6	131.6	10.34
Total, Christian	430.9	444.3	875.2	76.44	457.0	480.1	937.1	73.58
Non-Christian —								
Hebrew	1.5	1.4	2.9	0.25	1.6	1.5	3.2	0.25
Muslim	1.1	0.8	1.9	0.17	2.0	1.6	3.6	0.28
Other	1.8	1.4	3.3	0.29	2.6	2.2	4.9	0.38
Total, Non-Christian	4.5	3.6	8.1	0.71	6.2	5.4	11.6	0.91
Non-classifiable	3.0	2.4	5.5	0.48	4.4	3.6	8.0	0.63
No religious denomination	69.1	50.4	119.5	10.44	98.0	74.1	172.1	13.51
Not stated	73.6	63.0	136.6	11.93	77.6	67.2	144.8	11.37
GRAND TOTAL	581.2	563.7	1,144.9	100.00	643.1	630.5	1,273.6	100.00

(a) Figures as counted. (b) Includes those born at sea and *Not stated*.

INTERCENSAL INCREASES

POPULATION — ANALYSIS OF INTERCENSAL INCREASES, 1891-1981 (a) (‘000)

Period (b)	Population at beginning of period	Natural increase (c)		Net migration (d)		Total increase		Population at end of period
		Total	Annual average	Total	Annual average	Number	Annual average	
1891 — 1901 (10 years)	49.8	15.9	1.6	118.4	11.8	134.3	13.4	184.1
1901 — 1911 (10 years)	184.1	44.2	4.4	53.7	5.4	98.0	9.8	282.1
1911 — 1921 (10 years)	282.1	51.8	5.2	—1.2	—0.1	50.6	5.1	332.7
1921 — 1933 (12¼ years)	332.7	60.1	4.9	46.0	3.8	106.1	8.7	438.9
1933 — 1947 (14 years)	438.9	69.4	5.0	—5.8	—0.4	63.6	4.5	502.5
1947 — 1954 (7 years)	502.5	65.6	9.4	71.7	10.2	137.3	19.6	639.8
1954 — 1961 (7 years)	639.8	79.4	11.3	17.4	2.5	96.9	13.8	736.6
1961 — 1966 (5 years)	736.6	53.1	10.6	46.9	9.4	100.0	20.0	836.7
1966 — 1971 (5 years)	848.1	64.5	12.9	117.9	23.6	182.4	36.5	1,030.5
1971 — 1976 (5 years)	1,053.8	67.0	13.4	59.3	11.9	124.5 (e)	24.9	1,178.3
1976 — 1981 (5 years)	1,178.3	64.3	12.9	70.1	14.0	120.8 (e)	24.2	1,299.1

(a) Figures for 1961 and earlier exclude full-blood Aborigines. Figures for 1966 and earlier refer to census counts; those for 1971 and later refer to the estimated resident population. (b) For census dates, see first table in this Part. (c) Excess of births registered over deaths registered. Figures for periods prior to the 1971 Census are on a State of registration basis; those for later periods are on the basis of State of usual residence. (d) Interstate and overseas. Minus sign (—) indicates loss by migration. (e) Discrepancies between the sum of natural increase and net migration, and total increase, are due to intercensal adjustment.

The preceding table shows the population of Western Australia at each census from 1891 to 1981, and the intercensal gains or losses by natural increase and by migration. It also shows the average annual gains or losses in each intercensal period.

GEOGRAPHICAL DISTRIBUTION

Urban, Rural and Migratory Population

At the 1971, 1976 and 1981 Censuses a boundary was defined for each population cluster of 1,000 or more persons. These clusters are named 'urban centres' and the population enumerated in them is classified as urban for statistical purposes.

In determining the boundary of an urban centre with a population of 25,000 or more, all contiguous census collectors' districts which were found to have a minimum population density of approximately 200 persons per square kilometre at the census were included. Some areas of lower density were classified as urban in accordance with certain other specified criteria. The term *Major urban* is applied to those centres which had a population of 100,000 or more, and supersedes the term *Metropolitan* as used at previous censuses. Urban Perth is the only such centre in Western Australia.

Around each urban centre with a population of at least 100,000 a further boundary was defined to contain the anticipated development of the urban centre and associated smaller urban centres for a period of at least twenty years. This boundary delimits an area which is now, or is expected to be, in close social and economic contact with the urban centre. It is a fixed boundary, as distinct from the boundary of the urban centre which moves from census to census as urbanisation proceeds. In Western Australia, the area within this fixed boundary is described as the Perth Statistical Division (see maps inside back cover).

Urban Perth at 30 June 1981 comprised the Cities of Belmont, Fremantle, Nedlands, Perth, South Perth and Subiaco; the Towns of Bassendean, Claremont, Cottesloe, East Fremantle and Mosman Park; the Shires of Bayswater and Peppermint Grove; parts of the Cities of Canning, Cockburn, Gosnells, Melville and Stirling, part of the Town of Armadale and parts of the Shires of Kalamunda, Mundaring, Swan and Wanneroo.

In delimiting urban centres with a population of less than 25,000 persons all continuous urban growth is included (which, in small urban centres, would not necessarily occur if the density criterion were applied), together with any close but non-contiguous development which could be clearly regarded as part of the centre.

Rural population represents persons enumerated in the area not included in urban centres. The term *Migratory* refers to persons (both passengers and crew) who, at midnight on census night, were enumerated on board ships in Western Australian ports, or ships which had left an Australian port before census night for a next port of call in Western Australia. It includes also those who were enumerated on long-distance trains, motor coaches or aircraft.

URBAN AND RURAL POPULATIONS (a) (b) — STATES AND TERRITORIES CENSUSES, 1976 AND 1981

State or Territory	Census, 30 June 1976				Census, 30 June 1981			
	Urban	Rural	Migratory	Total population	Urban	Rural	Migratory	Total population
New South Wales	4,239,012	531,657	6,434	4,777,103	4,517,742	604,249	4,226	5,126,217
Victoria	3,203,666	441,610	1,705	3,646,981	3,365,991	464,352	2,100	3,832,443
Queensland	1,634,034	400,905	2,258	2,037,197	1,816,352	476,294	2,477	2,295,123
South Australia	1,056,956	186,433	1,367	1,244,756	1,090,042	194,040	951	1,285,033
Western Australia	956,077	186,115	2,665	1,144,857	1,073,885	197,671	2,068	1,273,624
Tasmania	301,923	100,368	575	402,866	314,934	103,569	454	418,957
Northern Territory	64,439	32,083	568	97,090	91,479	31,147	698	123,324
Australian Capital Territory	194,517	3,105	—	197,622	219,331	2,278	—	221,609
AUSTRALIA	11,650,624	1,882,276	15,572	13,548,472	12,489,756	2,073,600	12,974	14,576,330

(a) See text preceding table for definitions of *Urban*, *Rural*, etc. (b) Figures as counted at the Census.

Population of Urban Centres and Bounded Localities

Those urban centres and bounded localities which had a population of more than 200 persons at the 1981 Census are included in the following table.

POPULATION — URBAN CENTRES AND BOUNDED LOCALITIES
CENSUSES, 1976 AND 1981

Urban centre (U) or bounded locality	Population (a)				Intercensal increase or decrease	
	Census, 30 June —					
	1976	1981		Persons	Number	Per cent
	Persons	Males	Females	Persons		
Albany (U)	13,696	7,402	7,820	15,222	1,526	11.14
Augusta	464	278	310	588	124	26.72
Australind	832	866	815	1,681	849	102.04
Balgo	n.a.	248	213	461	..	..
Beverley	755	376	380	756	1	0.13
Boddington	355	188	179	367	12	3.38
Boyanup	283	177	188	365	82	28.98
Boyp Brook	611	310	338	648	37	6.06
Bridgetown (U)	1,316	771	750	1,521	205	15.58
Brookton	604	304	291	595	—9	—1.49
Broome (U)	2,920	1,943	1,723	3,666	746	25.55
Bruce Rock	603	289	276	565	—38	—6.30
Brunswick Junction	893	468	421	889	—4	—0.45
Bunbury (U)	19,513	10,915	10,834	21,749	2,236	11.46
Busselton (U)	5,550	3,101	3,362	6,463	913	16.45
Byford (U)	822	525	506	1,031	209	25.43
Capel	669	336	344	680	11	1.64
Carnamah	449	222	200	422	—27	—6.01
Carnarvon (U)	5,341	2,604	2,449	5,053	—288	—5.39
Cervantes	n.a.	131	111	242	..	..
Chidlow	248	195	193	388	140	56.45
Collie (U)	6,771	3,973	3,694	7,667	896	13.23
Coalgardie	643	473	418	891	248	38.57
Coorow	209	120	106	226	17	8.13
Corrigin	853	439	402	841	—12	—1.41
Cranbrook	375	173	143	316	—59	—15.73
Cue	258	174	146	320	62	24.03
Cundeelee	n.a.	148	112	260	..	..
Cunderdin	756	386	345	731	—25	—3.31
Dalwallinu	683	322	317	639	—44	—6.44
Dampier (U)	2,727	1,555	916	2,471	—256	—9.39
Darkan	266	119	123	242	—24	—9.02
Deanmill	281	123	101	224	—57	—20.28
Denham	346	218	184	402	56	16.18
Denmark	786	491	494	985	199	25.32
Derby (U)	2,411	1,546	1,387	2,933	522	21.65
Dongara	324	(b)	(b)	(b)	..	..
Dongara-Port Denison (U)	n.a.	633	522	1,155	..	..
Donnybrook (U)	1,008	590	607	1,197	189	18.75
Dowerin	421	204	206	410	—11	—2.61
Dumbleyung	263	142	132	274	11	4.18
Dunsborough	294	191	201	392	98	33.33
Dwellingup	450	247	206	453	3	0.67
Eaton (U)	1,423	1,095	1,131	2,226	803	56.43
Eneabba	n.a.	227	137	364	..	..
Esperance (U)	5,262	3,270	3,105	6,375	1,113	21.15
Exmouth (U)	2,336	1,342	1,241	2,583	247	10.57
Fitzroy Crossing	n.a.	219	209	428	..	..
Geraldton (U)	18,773	10,550	10,345	20,895	2,122	11.30
Gingin	332	192	190	382	50	15.06
Gnowangerup	892	448	424	872	—20	—2.24
Gogo	n.a.	108	109	217	..	..
Goldsworthy (U)	989	550	373	923	—66	—6.67
Goomalling	644	301	299	600	—44	—6.83
Greenbushes	232	170	151	321	89	38.36
Halls Creek	767	487	479	966	199	25.95
Harvey (U)	2,418	1,266	1,213	2,479	61	2.52
Jarrahdale	356	175	140	315	—41	—11.52
Jerramungup	225	156	138	294	69	30.67
Jurien	605	248	201	449	—156	—25.79

POPULATION — URBAN CENTRES AND BOUNDED LOCALITIES
CENSUSES, 1976 AND 1981 — *continued*

Urban centre (U) or bounded locality	Population (a)				Intercensal increase or decrease	
	Census, 30 June —					
	1976	1981		Persons	Number	Per cent
Persons	Males	Females	Persons			
Kalbarri	695	401	419	820	125	17.99
Kalgoorlie-Boulder (U)	19,041	10,509	9,339	19,848	807	4.24
Kambalda (U)	4,784	2,488	1,975	4,463	—321	—6.71
Karratha (U)	4,243	4,833	3,508	8,341	4,098	96.58
Katanning (U)	4,162	2,192	2,221	4,413	251	6.03
Kellerberrin (U)	1,198	549	542	1,091	—107	—8.93
Kojonup (U)	944	558	544	1,102	158	16.74
Kondinin	368	173	153	326	—42	—11.41
Koolyanobbing	296	160	117	277	—19	—6.42
Koorda	419	204	174	378	—41	—9.79
Kulin	357	185	161	346	—11	—3.08
Kununurra (U)	1,540	1,111	970	2,081	541	35.13
Kwinana Town Centre (U)	10,981	6,102	6,253	12,355	1,374	12.51
La Grange	n.a.	199	173	372	..	..
Lake Grace	616	317	258	575	—41	—6.66
Lancelin	247	223	176	399	152	61.54
Laverton	848	516	356	872	24	2.83
Leeman	n.a.	193	192	385	..	..
Leinster	n.a.	618	379	997	..	..
Leonora	468	299	225	524	56	11.97
Looma	n.a.	128	107	235	..	..
Mandurah (U)	7,050	5,505	5,473	10,978	3,928	55.72
Manjimup (U)	3,734	2,111	2,039	4,150	416	11.14
Marble Bar	262	201	156	357	95	36.26
Margaret River	701	408	390	798	97	13.84
Meekatharra	829	546	443	989	160	19.30
Menzies	n.a.	140	92	232	..	..
Merredin (U)	3,661	1,845	1,675	3,520	—141	—3.85
Mingenew	423	196	172	368	—55	—13.00
Moora (U)	1,545	863	814	1,677	132	8.54
Morawa	814	386	308	694	—120	—14.74
Mount Barker (U)	1,562	770	749	1,519	—43	—2.75
Mount Helena	261	153	158	311	50	19.16
Mount Magnet	362	372	246	618	256	70.72
Mowanjumb	n.a.	121	102	223	..	..
Mukinbudin	392	191	179	370	—22	—5.61
Mullewa	933	476	442	918	—15	—1.61
Mundaring	677	405	418	823	146	21.57
Mundijong	299	191	165	356	57	19.06
Nannup	487	294	258	552	65	13.35
Narembene	506	261	239	500	—6	—1.19
Narrogin (U)	4,812	2,473	2,496	4,969	157	3.26
Newman (U)	4,672	3,234	2,232	5,466	794	16.99
Norseman (U)	2,029	1,058	837	1,895	—134	—6.60
North Pinjarra (U)	1,006	584	544	1,128	122	12.13
Northam (U)	6,866	3,385	3,406	6,791	—75	—1.09
Northampton	703	387	363	750	47	6.69
Onslow	220	324	270	594	374	170.00
Pannawonica (U)	n.a.	758	412	1,170	..	..
Paraburdoo (U)	2,402	1,394	963	2,357	—45	—1.87
Peelhurst-Singleton	332	279	277	556	224	67.47
Pemberton	777	468	403	871	94	12.10
Perenjori	305	149	108	257	—48	—15.74
Perth (U)	731,275	397,235	411,800	809,035	77,760	10.63
Pingelly	978	482	455	937	—41	—4.19
Pinjarra (U)	1,196	671	665	1,336	140	11.71
Port Denison	522	(b)	(b)	(b)	..	..
Port Hedland (U)	11,144	7,079	5,869	12,948	1,804	16.19
Quairading	808	378	363	741	—67	—8.29
Quinns Rocks	560	399	417	816	256	45.71
Ravensthorpe	256	165	162	327	71	27.73
Rockingham (U)	17,693	12,496	12,436	24,932	7,239	40.91
Roebourne (U)	1,368	941	747	1,688	320	23.39
Shay Gap	856	519	334	853	—3	—0.35
Southern Cross	880	416	382	798	—82	—9.32
Strelley	n.a.	159	170	329	..	..

POPULATION — URBAN CENTRES AND BOUNDED LOCALITIES
CENSUSES, 1976 AND 1981 — *continued*

Urban centre (U) or bounded locality	Population (a)				Intercensal increase or decrease	
	Census, 30 June —					
	1976		1981			
	Persons	Males	Females	Persons	Number	Per cent
Tambellup	377	232	180	412	35	9.28
Tammin	288	133	121	254	—34	—11.81
Telfer	n.a.	240	104	344	..	..
Three Springs	605	341	297	638	33	5.45
Tom Price (U)	3,193	1,958	1,582	3,540	347	10.87
Toodyay	550	293	267	560	10	1.82
Turkey Creek	n.a.	118	94	212	..	..
Two Rocks	661	353	363	716	55	8.32
Wagin (U)	1,658	756	732	1,488	—170	—10.25
Walpole	262	156	135	291	29	11.07
Wanneroo (U)	4,319	3,377	3,368	6,745	2,426	56.17
Warburton	n.a.	186	174	360	..	..
Waroona (U)	1,160	770	692	1,462	302	26.03
Wickepin	246	138	129	267	21	8.54
Wickham (U)	2,312	1,287	1,100	2,387	75	3.24
Williams	475	234	219	453	—22	—4.63
Wiluna	n.a.	120	101	221	..	..
Wittenoom	962	140	107	247	—715	—74.32
Wongan Hills	888	488	459	947	59	6.64
Wundowie	969	382	338	720	—249	—25.70
Wyalkatchem	534	235	218	453	—81	—15.17
Wyndham (U)	1,383	823	686	1,509	126	9.11
Yanchep Beach	384	231	255	486	102	26.56
Yarloop	483	271	237	508	25	5.18
York (U)	1,108	599	537	1,136	28	2.53

(a) Figures as counted at the Census. (b) See Dongara-Port Denison.

Population in Statistical Divisions

In 1929, when statistics were first presented according to statistical divisions, Western Australia was divided into seven such areas. At the 1981 Census there were nine statistical divisions, and these have been used as the basis of compilation of the particulars in the next table.

For further information on the origin and purpose of statistical divisions see Chapter III — *Constitution and Government*.

The estimated resident population of the Perth Statistical Division at 30 June 1981 was 918,000, or 70.7 per cent of the State total, compared with 840,220 (71.3 per cent) five years earlier, an increase of 77,780 persons or 9.3 per cent. The State's natural increase between the Censuses was 64,050 of which the Perth Statistical Division is estimated to have contributed 39,463. In addition, this division experienced an estimated net gain by migration of 38,317.

The total estimated resident population in the area outside the Perth Statistical Division rose by 42,970 or 12.7 per cent. The natural increase in the area was an estimated 24,587, so that there was an estimated gain of 18,383 persons by migration.

The South-Eastern Statistical Division, and Carnegie and De Grey Statistical Sub-divisions together comprised an area of 1,564,516 square kilometres (or almost two-thirds of the State) and had an estimated resident population of only 71,740 persons at 30 June 1981. A low rainfall renders much of it virtually uninhabitable and desert or near-desert conditions prevail over some 900,000 square kilometres including much of the eastern and northern parts of the area and extending into the southern portion of the Kimberley Statistical Division. Almost no part of this desert area has an annual rainfall greater than 250 millimetres and a considerable proportion has much less. Of the total population of 70,645 persons counted in the three areas at the Census of

30 June 1981, approximately 85 per cent were enumerated in the urban centres of Kalgoorlie-Boulder (19,848), Port Hedland (12,948), Esperance (6,375), Newman (5,466), Kambalda (4,463) and Norseman (1,895), and the townships of Leinster (997), Meekatharra (989), Goldsworthy (923), Coolgardie (891), Laverton (872), Shay Gap (853), Southern Cross (798), Mount Magnet (618), Leonora (524), Marble Bar (357), Telfer (344), Ravensthorpe (327), Cue (320) and Menzies (232).

Population North of 26° S Latitude

For administrative and other purposes, the portion of the State lying north of the 26th parallel of latitude frequently has special significance. This area, which embraces part of the Central Statistical Division, and the whole of the Pilbara and Kimberley Statistical Divisions, is 1,371,367 square kilometres in extent and is therefore somewhat greater in area than half the entire State. It had a population, as counted at the Censuses, of 65,086 persons in 1976 and 78,319 in 1981. Of the 1981 total, over three-quarters were enumerated in the ports and other coastal settlements of Port Hedland (12,948), Karratha (8,341), Carnarvon (5,053), Broome (3,666), Derby (2,933), Exmouth (2,583), Dampier (2,471), Wickham (2,387), Roebourne (1,688), Wyndham (1,509) and Onslow (594); the iron ore mining centres of Newman (5,466), Tom Price (3,540), Paraburdoo (2,357), Pannawonica (1,170), Goldsworthy (923) and Shay Gap (853); the Ord River agricultural settlement at Kununurra (2,081); and the townships of Halls Creek (966), Fitzroy Crossing (428), Marble Bar (357), Telfer (344) and Wittenoom (247).

Population Density

Urban Perth is the most densely populated part of the State. Among the statistical divisions, Perth with an estimated resident population of 918,000 and 5,363 square kilometres in area showed the highest density, 171 persons per square kilometre. The Kimberley Statistical Division was the most sparsely populated with an area of 421,451 square kilometres (more than one-sixth of the entire State) and an estimated resident population of only 17,970 persons, equivalent to an average of one person to every twenty-three square kilometres.

The next table shows the area, estimated resident population and density of the State and of each statistical division at 30 June 1981.

STATISTICAL DIVISIONS — AREA, POPULATION AND DENSITY
30 JUNE 1981

Statistical division	Area (a)		Population (b)		
	Square kilometres	Per cent of total	Persons	Per cent of total	Density (per square kilometre)
Perth Statistical Division	5,363	0.21	918,000	70.66	171.17
Other divisions —					
South-West	26,661	1.06	102,250	7.87	3.84
Lower Great Southern	40,528	1.60	44,520	3.43	1.10
Upper Great Southern	45,684	1.81	23,920	1.84	0.52
Midlands	110,262	4.37	50,440	3.88	0.46
South-Eastern	614,388	24.33	43,480	3.35	0.07
Central (c)	753,365	29.83	50,920	3.92	0.07
Pilbara	510,335	20.21	47,590	3.66	0.09
Kimberley	421,451	16.69	17,970	1.38	0.04
Total	2,522,675	99.89	381,090	29.34	0.15
WESTERN AUSTRALIA	2,525,500	100.00	1,299,090	100.00	0.51

(a) See Chapter II, Part I. (b) Estimated resident population. (c) Includes Houtman Abrolhos (unincorporated).

Western Australia had a population density at the 1981 Census of only 0.51 persons per square kilometre, compared with an average of 1.94 for Australia as a whole. Victoria was the most densely populated State, having an average of 17.35 persons per square kilometre.

**AREA, POPULATION AND DENSITY — STATES AND TERRITORIES:
30 JUNE 1981**

State or Territory	Area (a)		Population (b)				
	Square kilometres	Per cent of total	Males	Females	Persons		
					Number	Per cent of total	Density (per square kilometre)
	'000		'000	'000	'000		
New South Wales	801.6	10.43	2,607.9	2,629.2	5,237.1	35.08	6.53
Victoria	227.6	2.96	1,960.1	1,988.5	3,948.6	26.45	17.35
Queensland	1,727.2	22.48	1,179.1	1,166.3	2,345.3	15.71	1.36
South Australia	984.0	12.81	654.7	664.6	1,319.3	8.84	1.34
Western Australia	2,525.5	32.87	656.4	642.7	1,299.1	8.70	0.51
Tasmania	67.8	0.88	212.4	214.9	427.3	2.86	6.30
Northern Territory	1,346.2	17.52	65.6	57.3	122.8	0.82	0.09
Australian Capital Territory	2.4	0.03	113.5	113.7	227.3	1.52	94.69
AUSTRALIA	7,682.3	100.00	7,449.6	7,477.2	14,926.8	100.00	1.94

(a) See Chapter II, Part I.

(b) Estimated resident population.

ABORIGINAL POPULATION

Reference is made at the beginning of this Part to the exclusion of *full-blood* Aborigines from the tabulations of census data prior to 1971. Aborigines have, however, been enumerated at all censuses of the Commonwealth, although the degree of coverage and information obtained have varied substantially since 1911. Since the Census taken in 1933, the adequacy of the particulars obtained has improved progressively, as a result of an increasing number of Aborigines coming into contact with more populated areas.

At the 1971, 1976 and 1981 Censuses the question relating to a person's race differed from that asked at previous censuses and the figures shown in the tables in this section are therefore not comparable with those from earlier censuses.

A special article by Dr I. M. Crawford, Head of Division of Human Studies, Western Australian Museum, considering historical aspects of the Aboriginal population is contained in Chapter I.

**ABORIGINAL POPULATION (a) — STATISTICAL DIVISIONS
WESTERN AUSTRALIA: CENSUS, 30 JUNE 1981**

Statistical division	Persons			
	Males	Females	Number	Per cent of total
Perth Statistical Division	3,421	3,614	7,035	22.44
Other divisions —				
South-West	610	553	1,163	3.71
Lower Great Southern	665	673	1,338	4.27
Upper Great Southern	512	427	939	3.00
Midlands	861	779	1,640	5.23
South-Eastern	1,171	1,120	2,291	7.31
Central	2,558	2,536	5,094	16.25
Pilbara	2,025	1,885	3,910	12.47
Kimberley	4,088	3,845	7,933	25.30
Total	12,490	11,820	24,308	77.54
Total all divisions	15,911	15,434	31,343	99.97
Migratory (b)	6	2	8	0.03
WESTERN AUSTRALIA (c)	15,920	15,431	31,351	100.00

(a) Includes Torres Strait Islanders. (b) See letterpress in the earlier section *Geographical Distribution*. (c) For information concerning random adjustment of data see section *The 1981 Census* at the beginning of this Chapter.

In the next table, details are given of the age distribution of the Aboriginal population recorded at the 1981 Census.

**ABORIGINAL POPULATION (a) — AGE
DISTRIBUTION, WESTERN AUSTRALIA:
CENSUS, 30 JUNE 1981**

Age last birthday (years)	Persons			
	Males	Females	Number	Per cent of total
0 — 4	2,119	1,989	4,108	13.10
5 — 9	2,393	2,190	4,583	14.62
10 — 14	2,330	2,284	4,614	14.72
15 — 19	1,953	1,871	3,824	12.20
20 — 24	1,521	1,569	3,090	9.86
25 — 29	1,191	1,177	2,368	7.55
30 — 34	861	914	1,775	5.66
35 — 39	710	714	1,424	4.54
40 — 44	636	622	1,258	4.01
45 — 49	568	528	1,096	3.50
50 — 54	478	434	912	2.91
55 — 59	289	286	575	1.83
60 — 64	292	298	590	1.88
65 and over	578	565	1,143	3.65
Total (b)	15,920	15,431	31,351	100.00

(a) Includes Torres Strait Islanders. (b) See footnote (c) to previous table.

ESTIMATES OF POPULATION

For dates other than those of the periodic census of population, estimates are based on records of births and deaths and of movements of population interstate and overseas. Estimates of the population of Australia and of each of the States and Territories are prepared by the Australian Statistician as at 31 March, 30 June, 30 September and 31 December in each year. Because the available records of interstate movement are incomplete, these intercensal estimates as they apply to States and Territories are approximate and are revised when the results of the next succeeding census become known.

The conceptual basis for population estimation in Australia changed in June 1981. Estimates since this date, together with revisions back to June 1971, have been made on the basis of the State of usual residence of the population. The June 1981 estimate for Western Australia was derived by adjusting the Census count for under-enumeration, subtracting all interstate and overseas visitors, and adding residents who were temporarily interstate or overseas on Census night.

Further information on estimated resident population is contained in the publication *Population Estimates: An Outline of the New Conceptual Basis of ABS Population Estimates* (Catalogue No. 3216.0) issued by the Australian Statistician, Canberra.

Mean Population

It is often useful to relate a given characteristic to population in order to express it in *per capita* terms or as 'per head of population'. In some cases it is appropriate to relate a characteristic to the population as at a specified date as, for example, savings bank balances per head of population at 30 June, or motor vehicles per head of population at 31 December.

Where events, as for instance births or deaths, are taking place continuously throughout a period, it is obviously not appropriate to relate these events to the population as at a specific date. It is necessary, therefore, to devise a measure which takes account of the change in population which occurs continuously throughout any period. This measure is known as the *mean population*.

As stated earlier, estimates of population are prepared as at the end of each quarter of the year. The mean population of a quarter might be taken to be the average, or arithmetic mean, of the populations at the beginning and the end of the quarter. If a represents the population at the beginning of year and b, c, d and e the populations at the end of the first, second, third and fourth quarters, respectively, these quarterly means would then be $\frac{1}{2}(a + b)$ for the first quarter, $\frac{1}{2}(b + c)$ for the second, $\frac{1}{2}(c + d)$ for the third and $\frac{1}{2}(d + e)$ for the fourth quarter. The mean population for the year might then be taken as the arithmetic mean of the four quarterly average populations, or

$$\frac{1}{4}[\frac{1}{2}(a + b) + \frac{1}{2}(b + c) + \frac{1}{2}(c + d) + \frac{1}{2}(d + e)]$$

which may be more simply expressed as $\frac{1}{8}(a + 2b + 2c + 2d + e)$. This method of deriving mean population had been in use in Western Australia prior to its general adoption by the 1903 Conference of Australian Statisticians. It was later superseded by the more precise measure

$$\frac{1}{12}(a + 4b + 2c + 4d + e)$$

which is now commonly used in Australian statistics. In order to establish uniformity with current practice, estimates of mean population for 1901 and later years were revised, where necessary, by the application of this formula.

The estimated mean population of Western Australia is shown in the next table for each financial and calendar year in the period from 1 January 1975 to 30 June 1981.

Population Estimates

As a result of the repeal, with effect from 10 August 1967, of section 127 of the Commonwealth Constitution, to which reference is made earlier, current population estimates no longer exclude full-blood Aborigines. Estimates for earlier dates and periods back to the Census of 30 June 1961 have also been prepared on the basis of *total* population (i.e. including Aborigines). Figures for dates and periods subsequent to 30 June 1976 are preliminary and subject to revision in accordance with the final results of the 1981 Census and adjustments to numbers of persons who were temporarily overseas on Census night.

ESTIMATED RESIDENT POPULATION (‘000)

Year	Population at end of year			Increase during year			Mean population		
	Males	Females	Persons	Natural increase (a)	Estimated net migration (b) p	Estimated total increase (c)	Males	Females	Persons
YEAR ENDED 30 JUNE									
1976	600.0	578.4	1,178.3	12.6	11.4	23.4	594.3	572.6	1,166.9
1977	612.3	592.5	1,204.8	13.1	16.1	26.5	606.1	585.7	1,191.8
1978	624.7	606.2	1,230.9	13.3	15.5	26.1	619.0	599.8	1,218.8
1979	635.8	618.4	1,254.1	12.7	13.2	23.2	630.2	612.2	1,242.4
1980	643.9	629.6	1,273.5	12.3	9.8	19.4	639.5	623.7	1,263.2
1981 p	656.4	642.7	1,299.1	12.9	15.4	25.6	649.7	635.9	1,285.5
YEAR ENDED 31 DECEMBER									
1976	606.0	585.9	1,191.9	13.0	13.2	24.5	600.1	578.9	1,179.0
1977	619.0	600.0	1,219.0	12.8	17.0	27.1	612.4	592.7	1,205.2
1978	629.8	611.9	1,241.7	12.9	12.6	22.7	624.9	606.3	1,231.2
1979	639.3	623.8	1,263.1	12.5	11.6	21.4	635.3	618.1	1,253.4
1980	649.4	635.7	1,285.1	12.5	12.3	22.0	643.9	629.4	1,273.3
1981 p	665.6	651.9	1,317.5	13.9	19.8	32.5	n.a.	n.a.	1,300.6

(a) Excess of births registered over deaths registered by State of usual residence. (b) Interstate and overseas. (c) Discrepancies between the sum of natural increase and net migration, and total increase are due to intercensal adjustment.

**ESTIMATED RESIDENT POPULATION — STATES AND TERRITORIES
(‘000)**

State or Territory	Estimated population at 31 December —					
	1976	1977	1978	1979	1980	1981p
New South Wales	4,979.1	5,027.6	5,073.5	5,133.1	5,203.1	5,269.8
Victoria	3,824.0	3,852.6	3,872.9	3,896.1	3,929.0	3,971.0
Queensland	2,111.7	2,155.0	2,198.5	2,248.6	2,306.6	2,386.2
South Australia	1,280.4	1,293.3	1,299.7	1,305.1	1,312.8	1,325.9
Western Australia	1,191.9	1,219.0	1,241.7	1,263.1	1,285.1	1,317.6
Tasmania	413.1	415.4	417.5	421.1	425.2	428.6
Northern Territory	100.3	104.5	109.0	113.2	119.8	126.3
Australian Capital Territory	209.3	213.4	216.6	219.6	224.7	228.2
AUSTRALIA	14,109.9	14,280.8	14,429.4	14,599.9	14,806.3	15,053.6

Chapter IV— continued

Part 2 — Births, Deaths and Marriages

THE REGISTRATION SYSTEM

Compulsory registration of births, deaths and marriages in Western Australia was originally provided for by legislation in the year 1841. The Statutes currently in force are the *Registration of Births, Deaths and Marriages Act 1961-1979* (State) and the *Marriage Act 1961* (Commonwealth). For administrative purposes, the State is divided into twenty-six Registry Districts, each having a District Registrar. Particulars of births, deaths and marriages reported to the District Registrars are sent to the Registrar-General at Perth, where a central registry office has been maintained since 1841. Local registers are kept at each district office.

Births are required to be registered within sixty days of the event, and must be notified by the father, the mother or the occupier of the premises where the birth took place. Special provisions and penalties apply to notification and registration after the expiration of the sixty-day period.

A fetal death (stillbirth) is required to be registered both as a birth and a death. From 1 January 1968 the term 'stillbirth', for registration purposes, refers to a child, not born alive, of at least twenty weeks' gestation, or with a birthweight of at least 400 grams. Previously it was restricted to cases where the gestation period was at least twenty-eight weeks. However, in accordance with the recommendations of the Ninth Revision Conference (1975) of the World Health Organisation, figures for fetal deaths in this Part relate to any child, not born alive, weighing at least 500 grams at delivery or, when birthweight is unavailable, of at least 22 weeks gestation.

Deaths are required to be registered within fourteen days. Notification must be given by the person who disposes of the body or by the occupier of the premises where the death occurred. As in the case of births, special provisions and penalties exist for the late registration of a death.

Marriages are celebrated by persons authorised as celebrants under the provisions of the *Marriage Act 1961* (Commonwealth). These may be ministers of religion, District Registrars, or other authorised persons. Celebrants other than District Registrars are required to lodge a marriage certificate with the District Registrar for registration within fourteen days of the celebration of a marriage. A penalty fee is provided for registrations after fourteen days from the date of marriage.

Statistics of births, deaths and marriages are prepared from the registration documents.

The following table shows, for the years 1979 to 1981, the number of births and deaths registered in Western Australia, classified according to statistical divisions. The figures do not necessarily represent the number of such events which actually occurred in a particular statistical division during each year, since births are allocated to the usual place of residence of the mother and deaths to the usual place of residence of the deceased. Further, the statistics are compiled according to date of registration and not date of occurrence.

The statistical divisions shown on the following page are as they existed at 30 June 1981 and their component local government areas are given in lists at the end of Chapter III.

Additional information concerning births, deaths, marriages and divorce is contained in the annual publication *Demography* (Catalogue No. 3101.5) published by the Western Australian Office of the Bureau. Details of the number of births and deaths relating to individual local government areas in the State appear in *Local Government* (Catalogue No. 1303.5).

**BIRTHS AND DEATHS — NUMBERS REGISTERED
STATISTICAL DIVISIONS (a)**

Statistical division (a)	Live births			Deaths (b)		
	1979	1980	1981	1979	1980	1981
Perth Statistical Division	13,685	13,776	14,397	5,925	6,123	5,892
Other divisions —						
South-West	1,562	1,570	1,781	655	645	664
Lower Great Southern	791	775	765	276	253	252
Upper Great Southern	499	482	492	112	142	110
Midlands	976	960	986	290	240	254
South-Eastern	719	767	870	282	286	275
Central	884	939	987	224	240	273
Pilbara	939	915	1,108	119	100	148
Kimberley	414	423	491	137	137	125
Total	6,784	6,831	7,480	2,095	2,043	2,101
WESTERN AUSTRALIA	20,469	20,607	21,877	8,020	8,166	7,993

(a) For component local government areas, see lists at the end of Chapter III.

(b) Fetal deaths are not included; see next table.

BIRTHS

Statistics of births registered in each of the six years 1976 to 1981 in the Perth Statistical Division, the rest of the State, and in Western Australia as a whole, according to mother's usual place of residence, are shown in the following table. Additional details of fetal deaths appear later in this Part.

BIRTHS REGISTERED

Year	Live births				Multiple births (b)	Fetal deaths
	Males (a)	Females (a)	Persons (a)	Ex-nuptial births		
PERTH STATISTICAL DIVISION						
1976	6,931	6,557	13,488	1,342	219	130
1977	7,070	6,501	13,571	1,308	251	96
1978	7,046	6,673	13,719	1,407	286	114
1979	6,950	6,735	13,685	1,521	267	99
1980	7,038	6,738	13,776	1,575	296	104
1981	7,487	6,910	14,397	1,764	300	89
OTHER DIVISIONS						
1976	3,732	3,450	7,182	1,279	106	70
1977	3,647	3,433	7,080	1,220	131	62
1978	3,611	3,281	6,892	1,247	149	59
1979	3,455	3,329	6,784	1,262	125	52
1980	3,491	3,340	6,831	1,258	98	55
1981	3,855	3,625	7,480	1,536	151	65
WESTERN AUSTRALIA						
1976	10,663	10,007	20,670	2,621	325	200
1977	10,717	9,934	20,651	2,528	382	158
1978	10,657	9,954	20,611	2,654	435	173
1979	10,405	10,064	20,469	2,783	392	151
1980	10,529	10,078	20,607	2,833	394	159
1981	11,342	10,535	21,877	3,300	451	154

(a) Includes ex-nuptial births and multiple births. (b) Number of live-born children.

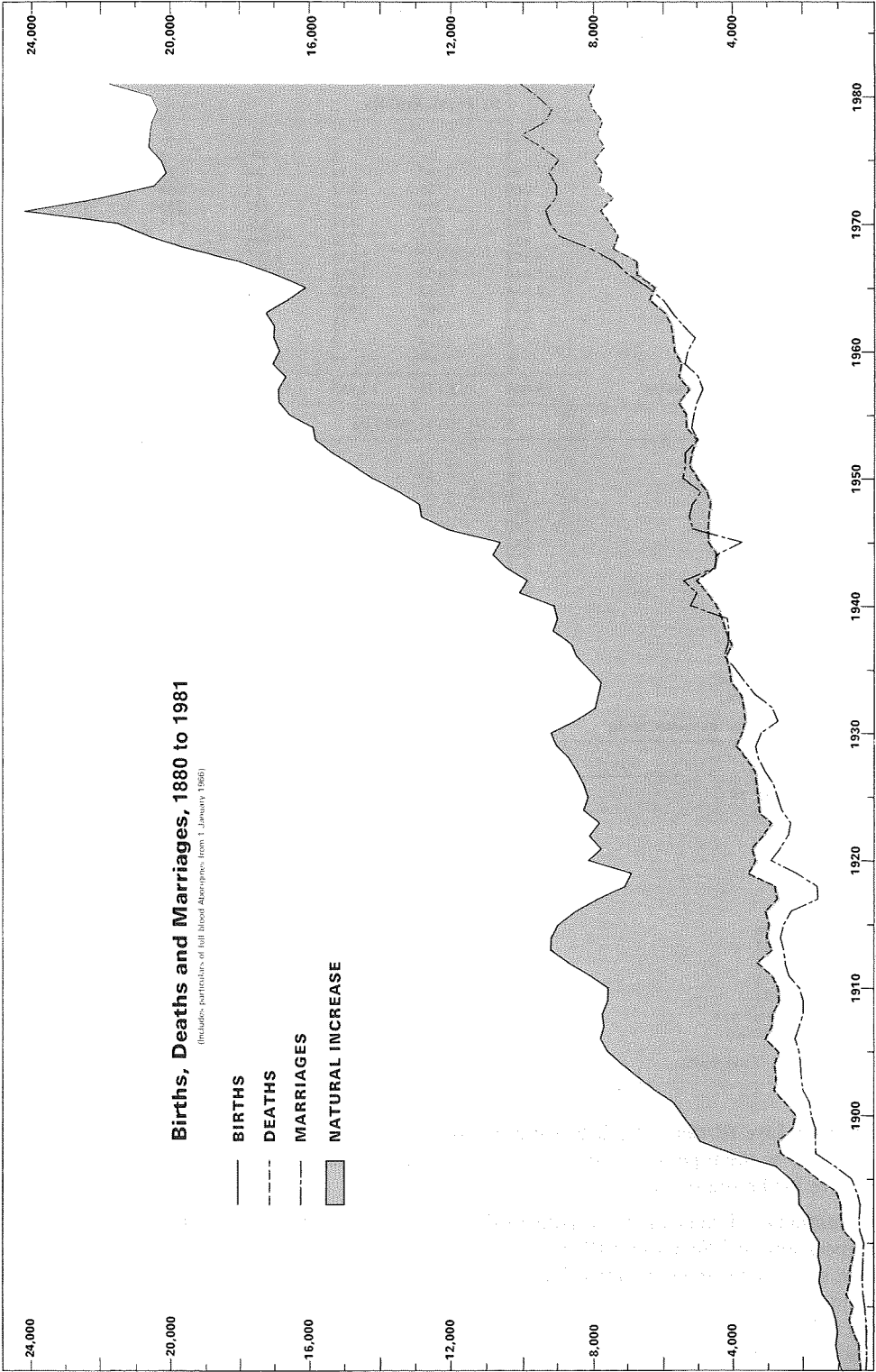
In the following table, births registered in Western Australia during each of the years 1976 to 1981 are classified according to age of mother.

BIRTHS REGISTERED — AGE OF MOTHER

Age of mother (years)	1976	1977	1978	1979	1980	1981
NUPTIAL BIRTHS						
14	—	—	—	—	—	—
15	3	—	2	—	1	1
16	55	47	33	24	21	18
17	160	150	112	83	64	72
18	351	300	264	222	233	195
19	594	571	488	428	418	380
20	882	782	738	648	663	620
21-24	5,595	5,435	5,230	5,005	4,837	4,844
25-29	7,044	7,103	7,296	7,227	7,189	7,656
30-34	2,554	2,953	3,003	3,215	3,476	3,808
35-39	679	668	691	749	748	841
40-44	123	110	93	82	115	139
45 and over	9	4	7	3	9	3
Not stated	—	—	—	—	—	—
Total, nuptial births	18,049	18,123	17,957	17,686	17,774	18,577
EX-NUPTIAL BIRTHS						
Under 14	5	2	3	2	3	7
14	10	13	16	21	15	14
15	76	51	68	60	47	40
16	165	127	133	141	152	147
17	242	221	208	223	224	243
18	243	243	234	264	263	277
19	237	251	252	286	268	322
20	217	231	241	239	247	298
21-24	641	655	688	726	775	891
25-29	470	430	478	491	513	629
30-34	196	199	230	231	229	298
35-39	84	81	82	76	82	105
40-44	27	19	18	19	14	26
45 and over	5	2	—	4	—	3
Not stated	3	3	3	—	1	—
Total, ex-nuptial births	2,621	2,528	2,654	2,783	2,833	3,300
TOTAL BIRTHS						
Under 14	5	2	3	2	3	7
14	10	13	16	21	15	14
15	79	51	70	60	48	41
16	220	174	166	165	173	165
17	402	371	320	306	288	315
18	594	543	498	486	496	472
19	831	822	740	714	686	702
20	1,099	1,013	979	887	910	918
21-24	6,236	6,090	5,918	5,731	5,612	5,735
25-29	7,514	7,533	7,774	7,718	7,702	8,285
30-34	2,750	3,152	3,233	3,446	3,705	4,106
35-39	763	749	773	825	830	946
40-44	150	129	111	101	129	165
45 and over	14	6	7	7	9	6
Not stated	3	3	3	—	1	—
Total, births	20,670	20,651	20,611	20,469	20,607	21,877

Ex-nuptial Live Births. A birth is registered as ex-nuptial if the parents were not married to one another at the time of the confinement. Ex-nuptial births in 1981 comprised 15.1 per cent of all live births registered.

Legitimations. Under the provisions of the *Marriage Act* 1961 (Commonwealth) which came into operation on 1 September 1963, a child whose parents were not married to each other at the time of its birth becomes legitimised on the subsequent marriage of its parents. The legitimisation takes place whether or not there was a legal impediment to the marriage of the parents at the time of the child's birth, and whether or not the child was still living at the time of the marriage, or in the case of a child born before 1 September 1963, at that date.



Crude Birth Rates. The crude birth rate in any period may be defined as the number of live births occurring during the period for every thousand of the mean population.

The average annual rates for each five-year period in the thirty years from 1951 to 1980 and the rates for single years from 1976 to 1981, for Western Australia and Australia as a whole, are shown in the following table.

CRUDE BIRTH RATES (a)
WESTERN AUSTRALIA AND AUSTRALIA

Period	Average annual rate		Year	Annual rate p	
	Western Australia	Australia		Western Australia	Australia
1951-55	25.4	22.9	1976	17.5	16.2
1956-60	24.2	22.6	1977	17.1	15.9
1961-65	21.7	21.3	1978	16.7	15.6
1966-70	21.1	20.0	1979	16.3	15.4
			1980	16.2	15.3
			1981	16.8	15.8
1971-75	19.5	18.8			
1976-80 p	16.8	15.7			

(a) Rates prior to 1966 exclude particulars of full-blood Aborigines. Rates for years prior to 1971 are based on final census counts; those for 1971-75 and later are based on the estimated resident population.

In each year of the period under review, Western Australia's crude birth rate has been higher than that of Australia.

In Western Australia, the rate showed a marked and almost continuous decrease from the beginning of the century to the depression of thirty years later when the unprecedentedly low rate of 17.6 was recorded in 1934. In the following years a fairly consistent increase was evident until 1952 when the rate reached 25.7, its highest level since 1917. The rate then declined and in 1965 was 19.8, the lowest since 1940. It increased in each succeeding year until 1971 when the rate was 23.3, the highest recorded since 1959. It fell in each of the next nine years and in 1980 was 16.2, the lowest ever recorded.

Age-specific Birth Rates. As a measure of fertility, the crude birth rate has the advantage of simplicity in calculation. The data necessary for its computation are usually readily available from published statistics, and it is therefore useful in comparing the fertility of the populations of States and countries for which no additional data are available. However, it is of limited use, since it does not take into account the important factors of age and sex composition of the population. Age-specific birth rates, which do have regard to these factors, therefore provide a better measure of fertility. Age-specific birth rates represent the number of births to women of specified ages per thousand women of those particular ages, and thus take cognisance of the variations in fertility experienced by women at the successive stages of their child-bearing life.

AGE-SPECIFIC BIRTH RATES (a) — WESTERN AUSTRALIA

Year	Age group (years)						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1954	42.7	231.1	217.8	135.7	71.7	23.6	1.5
1961	47.1	246.9	231.9	127.4	61.8	20.6	1.2
1966	53.8	203.1	197.1	102.1	45.7	13.3	1.4
1971	61.6	198.2	198.2	99.7	40.7	9.7	0.7
1976 p	39.9	142.2	148.9	69.4	21.5	5.0	0.5
1981 p	30.2	116.4	147.2	75.3	22.5	4.6	—

(a) Number of live births registered per 1,000 women in each age group. Rates prior to 1966 exclude particulars of full-blood Aborigines. Rates for years prior to 1971 are based on final census counts; those for 1971 and later are based on the estimated resident population.

For purposes of comparison with Western Australian experience, age-specific birth rates for Australia as a whole are given in the following table.

AGE-SPECIFIC BIRTH RATES (a) — AUSTRALIA

Year	Age group (years)						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1954	39.2	197.1	194.0	121.8	64.4	20.2	1.5
1961	47.4	225.8	221.2	131.1	63.4	19.2	1.4
1966	49.3	172.8	183.3	105.3	50.6	14.3	1.1
1971	54.3	176.1	188.1	99.5	42.9	11.1	0.8
1976 p	35.2	128.3	146.2	72.5	24.1	5.5	0.4
1981 p	28.1	107.3	145.1	77.5	24.4	4.5	0.3

(a) See footnote (a) to previous table.

Gross and Net Reproduction Rates. The gross reproduction rate is derived from fertility rates representing the number of *female* births to women of specified ages per thousand women of those particular ages. It provides a measure of the number of female children who would be born, on the average, to every woman assuming that she lives through the whole of the child-bearing period and that the basic fertility rates remain unaltered throughout.

The gross reproduction rate assumes that all females survive to the end of their child-bearing capacity. A more accurate measure, which takes into account the effect of mortality among women during this period is the net reproduction rate. This rate represents the average number of female children who would be born to women during their lifetime if they were subject in each succeeding year of life to the fertility and mortality rates on which the calculation is based. The net reproduction rate is a measure of the number of women who, in the next generation, will replace the women of reproductive age in the current generation. It provides a useful indication of likely future population trends. A rate remaining stationary at unity indicates an ultimately static population. If a rate greater than unity is maintained, an ultimate increase of population will result, while a continuing rate less than unity will lead to an ultimate decline.

GROSS AND NET REPRODUCTION RATES (a)
WESTERN AUSTRALIA AND AUSTRALIA

Year	Gross reproduction rate		Net reproduction rate	
	Western Australia	Australia	Western Australia	Australia
1947	1.683	1.494	(b) 1.595	(b) 1.416
1954	1.772	1.559	(c) 1.704	(c) 1.499
1961	1.785	1.728	(d) 1.730	(d) 1.672
1966	1.486	1.401	(e) 1.441	(e) 1.357
1971	1.477	1.403	(f) 1.434	(f) 1.362
1976 p	1.037	1.004	(g) 1.013	(g) 0.981
1977 p	1.001	0.977	(g) 0.979	(g) 0.955
1978 p	0.971	0.953	(g) 0.951	(g) 0.933
1979 p	0.958	0.930	(g) 0.939	(g) 0.911
1980 p	0.919	0.920	(g) 0.937	(g) 0.902
1981 p	0.954	0.941	(g) 0.937	(g) 0.924

(a) Rates prior to 1966 exclude particulars of full-blood Aborigines. Rates for years prior to 1971 are based on final census counts; those for 1971 and later are based on the estimated resident population. (b) Based on 1946-48 mortality experience. (c) Based on 1953-55 mortality experience. (d) Based on 1960-62 mortality experience. (e) Based on 1965-67 mortality experience. (f) Based on 1970-72 mortality experience. (g) Based on Annual Life Tables calculated by the Australian Statistician. Because of the method of calculation, these figures are subject to annual fluctuation which may not be indicative of a longer term trend.

DEATHS

DEATHS REGISTERED

Year	Deaths (a)			Infant deaths (b)		
	Males	Females	Persons	Males	Females	Persons
PERTH STATISTICAL DIVISION						
1976	3,112	2,529	5,641	81	67	148
1977	3,187	2,609	5,796	93	61	154
1978	3,107	2,555	5,662	67	52	119
1979	3,291	2,634	5,925	90	55	145
1980	3,429	2,694	6,123	79	57	136
1981	3,318	2,574	5,892	68	43	111
OTHER DIVISIONS						
1976	1,368	731	2,099	72	53	125
1977	1,346	757	2,103	54	43	97
1978	1,367	765	2,132	56	55	111
1979	1,302	793	2,095	63	39	102
1980	1,247	796	2,043	64	39	103
1981	1,339	762	2,101	44	38	82
WESTERN AUSTRALIA						
1976	4,480	3,260	7,740	153	120	273
1977	4,533	3,366	7,899	147	104	251
1978	4,474	3,320	7,794	123	107	230
1979	4,593	3,427	8,020	153	94	247
1980	4,676	3,490	8,166	143	96	239
1981	4,657	3,336	7,993	112	81	193

(a) Including infant deaths. (b) Deaths occurring in the first year of life.

Crude Death Rates. The crude death rate is perhaps the most common measure of mortality, and is derived by relating the deaths occurring in a period to the mean population for that period. It is usually expressed as number of deaths per thousand of mean population.

The average annual rates for each five-year period in the thirty years from 1951 to 1980 and the rates for single years from 1976 to 1981, for Western Australia and Australia as a whole, are shown in the following table.

CRUDE DEATH RATES (a)

WESTERN AUSTRALIA AND AUSTRALIA

Period	Average annual rate		Year	Annual rate p	
	Western Australia	Australia		Western Australia	Australia
1951-55	8.5	9.2	1976	6.6	8.1
1956-60	7.9	8.8	1977	6.6	7.7
1961-65	7.8	8.8	1978	6.3	7.6
			1979	6.4	7.3
1966-70	7.8	8.9	1980	6.4	7.4
			1981	6.2	7.3
1971-75	7.1	8.3			
1976-80 p	6.5	7.6			

(a) Rates prior to 1966 exclude particulars of full-blood Aborigines. Rates for years prior to 1971 are based on final census counts; those for 1971-75 and later are based on the estimated resident population.

In the early years of the century, the Western Australian rate was higher than that for Australia as a whole, but fell below the Australian average in 1909. Since that time, the rate for Western Australia has, with very few exceptions, remained lower than that for Australia.

Western Australia's crude death rate for the year 1902 was 13.8 per thousand of the mean population but by 1931 it had fallen to 8.5. After that year, the rate increased until it reached 10.6 in 1942. Then there was a general decline until 1963 when the rate was 7.7. The rate for 1981 was 6.2 per thousand of mean population, the lowest ever recorded in Western Australia.

Standardised Death Rates. The crude death rate expresses simply the number of deaths occurring in a population during any period as a proportion of the mean population for that period. Although this rate is useful as a measure of the absolute level of mortality, its value is necessarily restricted when comparing the mortality in different communities in the same period, or in one community at different times.

The effect on the crude death rate of the presence in a community of a high proportion of young people or of aged people, or of a high or low masculinity, will be readily appreciated. To devise an adequate measure of comparative mortality, it is therefore necessary to select a 'standard' population to which the varying mortality experiences may be referred. A standard population compiled by the International Statistical Institute, based upon the age and sex distribution of the population of nineteen European countries at their censuses nearest to the year 1900, has been used as the basis of the standardised death rates for Western Australia and Australia given in the next paragraph. The rate is computed by applying to each sex and age group in the standard population, the death rates actually recorded in the corresponding groups of the State and Australian populations. The sum of these results represents the number of deaths which would have occurred in the standard population if it had been exposed to the same risks of mortality. The standardised death rate is derived by expressing this number in terms of 'per thousand of the standard population'.

For the Census years 1921, 1933, 1947, 1954, 1961 and 1966 the standardised death rates for Western Australia were 11.9, 8.7, 7.3, 6.7, 6.0 and 6.2, and the corresponding rates for Australia as a whole were 10.6, 8.6, 7.3, 6.9, 6.3 and 6.5. These rates have been compiled on a basis which excludes full-blood Aborigines. The rates for 1971 and 1976, calculated on the basis of total population (i.e. including Aborigines), were 6.2 and 5.1 for Western Australia and 6.3 and 5.6 for Australia respectively.

Causes of Death. Statistics of causes of death provide important numerical facts by which to evaluate the varying health conditions and needs of different countries. In order to enable valid international comparisons, it is necessary that each country present its statistics of causes of death in a uniform manner. The first classification of causes of death to be adopted internationally was that compiled by Dr J. Bertillon at the request of the International Statistical Institute meeting in Vienna in 1891. Subsequently this classification was periodically revised by the Institute in collaboration with the League of Nations Health Organization. More recently, revisions have been carried out by a Committee of the World Health Organization.

PRINCIPAL CAUSES OF DEATH, 1980

International number	Cause of death	Males	Females	Persons	Per cent of all deaths	Rate (a) p
000-139	Infective and parasitic diseases —					
010-012	Tuberculosis of respiratory system	4	1	5	0.1	0.4
	Other infective and parasitic diseases	21	28	49	0.6	3.8
140-239	Neoplasms —					
140-199	Malignant —					
150-159	Digestive organs and peritoneum	295	228	523	6.4	41.1
162	Trachea, bronchus and lung	302	98	400	4.9	31.4
174-175	Breast	—	125	125	1.5	9.8
179-189	Genito-urinary organs	144	125	269	3.3	21.1
	Other	170	115	285	3.5	22.4
200-208	Lymphatic and haematopoietic tissue —					
204-208	Leukaemia and aleukaemia	60	25	85	1.0	6.7
	Other	50	42	92	1.1	7.2
210-239	Benign, other and unspecified	17	13	30	0.4	2.4
240-279	Endocrine, nutritional and metabolic diseases —					
250	Diabetes mellitus	51	86	137	1.7	10.8
	Other	22	23	45	0.6	3.5
280-289	Diseases of blood and blood-forming organs	9	11	20	0.2	1.6
290-319	Mental disorders	40	38	78	1.0	6.1
320-389	Diseases of the nervous system and sense organs	50	52	102	1.2	8.0

PRINCIPAL CAUSES OF DEATH, 1980 — *continued*

International number	Cause of death	Males	Females	Persons	Per cent of all deaths	Rate (a) p
390-459	Diseases of the circulatory system —					
393-398	Rheumatic heart disease	15	24	39	0.5	3.1
410-414	Ischaemic heart disease	1,333	874	2,207	27.0	173.3
430-438	Cerebrovascular disease	387	471	858	10.5	67.4
	Other	358	394	752	9.2	59.1
460-519	Diseases of the respiratory system —					
480-486	Pneumonia	89	93	182	2.2	14.3
490-493	Bronchitis, emphysema and asthma	140	56	196	2.4	15.4
	Other	228	78	306	3.7	24.0
520-579	Diseases of the digestive system	165	106	271	3.3	21.3
580-629	Diseases of the genito-urinary system	53	60	113	1.4	8.9
630-676	Complications of pregnancy, childbirth and the puerperium	—	—	—	—	—
680-709	Diseases of the skin and subcutaneous tissue	1	3	4	—	0.3
710-739	Diseases of the musculoskeletal system and connective tissue	7	25	32	0.4	2.5
740-759	Congenital anomalies	53	45	98	1.2	7.7
760-779	Certain conditions originating in the perinatal period	64	47	111	1.4	8.7
780-799	Symptoms, signs and ill-defined conditions	55	24	79	1.0	6.2
800-999	Accidents, poisonings and violence —					
810-825	Motor vehicle accidents	224	77	301	3.7	23.6
850-869	Accidental poisonings	20	8	28	0.3	2.2
880-888	Accidental falls	23	41	64	0.8	5.0
950-959	Suicide and self-inflicted injury	101	24	125	1.5	9.8
	Other	125	30	155	1.9	12.2
	All causes	4,676	3,490	8,166	100.0	641.3

(a) Per 100,000 of mean estimated resident population.

The figures in the previous table have been compiled on the basis of the *International Statistical Classification of Diseases, Injuries, and Causes of Death* (Ninth Revision, 1975), operative from 1 January 1979. The term 'cause of death', as used in this table and elsewhere in this Part, means (a) the disease or injury which initiated the train of morbid events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury'.

Infant Deaths. The term 'infant death' refers to a death which occurs before the completion of the first year of life. In the following table, infant deaths registered in Western Australia during each of the six years to 1981 are classified according to age at death.

INFANT MORTALITY — AGES AT DEATH

Year	Days					Total under 28 days	Months			Total under 1 year
	Under 1	1-6	7-13	14-20	21-27		Under 3	3-5	6-11	
MALES										
1976	59	27	4	1	4	95	114	25	14	153
1977	53	28	7	8	6	102	123	20	4	147
1978	52	22	6	1	3	84	98	15	10	123
1979	58	30	7	3	2	100	127	14	12	153
1980	54	26	10	4	2	96	115	20	8	143
1981	43	11	6	9	1	70	87	18	7	112

INFANT MORTALITY — AGES AT DEATH — *continued*

Year	Days					Total under 28 days	Months			Total under 1 year
	Under 1	1-6	7-13	14-20	21-27		Under 3	3-5	6-11	
FEMALES										
1976	42	23	11	3	2	81	91	13	16	120
1977	38	19	8	6	2	73	82	12	10	104
1978	40	24	2	3	2	71	79	14	14	107
1979	35	22	8	2	2	69	78	8	8	94
1980	39	20	9	4	2	74	82	9	5	96
1981	28	11	6	6	3	54	66	10	5	81
PERSONS										
1976	101	50	15	4	6	176	205	38	30	273
1977	91	47	15	14	8	175	205	32	14	251
1978	92	46	8	4	5	155	177	29	24	230
1979	93	52	15	5	4	169	205	22	20	247
1980	93	46	19	8	4	170	197	29	13	239
1981	71	22	12	15	4	124	153	28	12	193

Infant Mortality Rates. The infant mortality rate expresses the relationship between deaths of infants and the live births occurring in a period, and is stated in terms of number of deaths under one year of age per thousand live births.

The average annual rates for each five-year period in the thirty years from 1951 to 1980 and the rates for single years from 1976 to 1981, for Western Australia and Australia as a whole, are shown in the following table.

**INFANT MORTALITY RATES (a)
WESTERN AUSTRALIA AND AUSTRALIA**

Period	Average annual rate		Year	Annual rate	
	Western Australia	Australia		Western Australia	Australia
1951-55	24.4	23.3	1976	13.2	13.8
1956-60	21.4	21.1	1977	12.2	12.5
1961-65	20.7	19.4	1978	11.2	12.2
1966-70	20.2	18.1	1979	12.1	11.4
1971-75	16.7	16.2	1980	11.6	10.7
1976-80	12.1	12.1	1981	8.8	10.0

(a) Rates prior to 1966 exclude particulars of full-blood Aborigines.

In the first decade of the century, the average annual rate (106.1) in Western Australia was considerably above the Australian average of 86.8, and was the highest of any State. Since then both the Western Australian and the Australian rates have shown a remarkable decrease. In the five years ended 1980, Western Australia's average annual rate of 12.1 was the same as the Australian rate.

Causes of Infant Deaths. The causes of infant deaths registered during the year 1980 are set out in the following table.

INFANT MORTALITY — CAUSES OF DEATH, 1980

International number	Cause of death (a)	Males	Females	Persons
	Causes mainly of prenatal and natal origin —			
740-759	Congenital anomalies	42	27	69
765	Immaturity	22	9	31
767	Birth trauma	—	1	1
768	Hypoxia and birth asphyxia	8	5	13
769	Respiratory distress syndrome	8	7	15
770	Other respiratory conditions	7	10	17
771	Infections specific to the perinatal period	1	3	4
772	Fetal and neonatal haemorrhage	9	6	15
777	Perinatal disorders of digestive system	2	1	3
	Other	6	5	11
	Total	105	74	179
	Causes mainly of postnatal origin —			
798	Sudden death, cause unknown	24	11	35
	Other	14	11	25
	Total	38	22	60
	All causes	143	96	239

(a) Classified in accordance with the *International Statistical Classification of Diseases, Injuries, and Causes of Death* (Ninth Revision), operative from 1 January 1979.

Fetal Deaths. The infant mortality rate discussed above is that most commonly used, and takes no account of fetal deaths. It is informative, however, to examine the occurrence of fetal deaths in comparison with infant deaths, as in the next table, which deals with the experience of the six years 1976 to 1980.

FETAL AND INFANT DEATHS NUMBERS AND MASCULINITY

Year	Fetal deaths (a)				Infant deaths			
	Males	Females	Persons	Masculinity (b)	Males	Females	Persons	Masculinity (b)
1976	102	98	200	104.1	153	120	273	127.5
1977	97	61	158	159.0	147	104	251	141.3
1978	95	78	173	121.8	123	107	230	115.0
1979	80	71	151	112.7	153	94	247	162.8
1980	71	88	159	80.7	143	96	239	149.0
1981	79	75	154	105.3	112	81	193	138.3

(a) See letterpress *The Registration System* earlier in this Part.

(b) Number of males to each 100 females.

The relationship between fetal and infant deaths during the same period is further examined in the following table, which shows the numbers of fetal deaths and infant deaths at various ages. The rates shown are the number of fetal deaths, or of infant deaths, per thousand of total births. The average annual rate for the six-year period ended 1981 was 20.8.

FETAL AND INFANT DEATHS NUMBERS AND RATES

Year	Fetal deaths (<i>a</i>)	Infant deaths			Fetal and infant deaths (<i>a</i>)
		Under 7 days	Under 28 days	Under 1 year	
NUMBER					
1976	200	151	176	273	473
1977	158	138	175	251	409
1978	173	138	155	230	403
1979	151	145	169	247	398
1980	159	129	170	239	398
1981	154	93	124	193	347
RATE (<i>b</i>)					
1976	9.6	7.2	8.4	13.1	22.7
1977	7.6	6.6	8.4	12.1	19.6
1978	8.3	6.6	7.4	11.1	19.4
1979	7.3	7.0	8.2	12.0	19.3
1980	7.6	6.2	8.2	11.5	19.2
1981	7.0	4.2	5.6	8.8	15.8

(a) See letterpress *The Registration System* earlier in this Part. (b)
Rate per 1,000 of total births.

Age-specific Death Rates. The age-specific death rate expresses the number of deaths at specified ages in terms of the population at those particular ages. In the following table, which shows age-specific death rates for Western Australia, the average annual rates for each period relate to deaths in the three years surrounding the date of a population census. For census dates see table in Part 1 of this Chapter.

AGE-SPECIFIC DEATH RATES (a) (b)

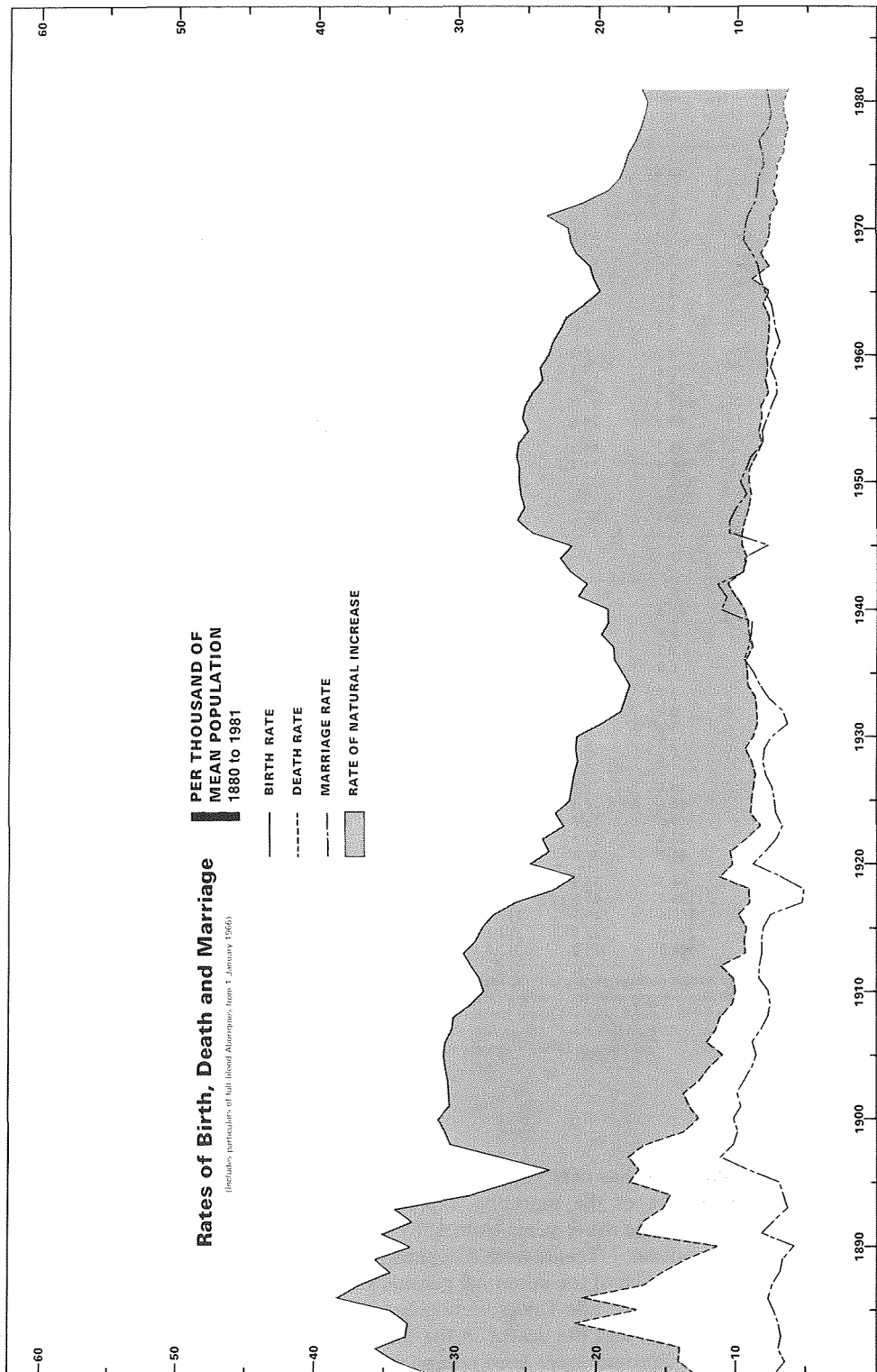
Age group (years)	1920-22	1932-34	1946-48	1953-55	1960-62	1965-67	1970-72 r	1975-77 p
MALES								
Under 1	}			7.0	{ (b) 22.9	{ (b) 22.1	{ (b) 20.6	{ (b) 14.3
1-4								
5-9								
10-14								
15-19								
20-24	4.0	2.5	2.2	2.0	1.7	1.6	1.8	1.7
25-29	4.1	2.9	2.0	1.9	1.5	1.5	1.5	1.3
30-34	5.4	3.1	2.3	1.8	1.6	1.8	1.6	1.7
35-39	6.4	4.0	2.5	2.2	2.1	2.3	2.1	2.0
40-44	7.9	5.7	4.2	3.2	3.5	3.4	2.9	2.9
45-49	12.1	8.8	6.3	5.8	5.0	5.3	5.3	5.1
50-54	17.2	13.5	11.5	9.0	9.5	9.2	8.2	8.3
55-59	23.8	21.4	17.2	15.8	14.8	16.1	14.5	13.6
60-64	34.2	28.3	26.3	24.8	23.8	25.4	24.4	22.0
65-69	49.5	42.4	40.3	41.5	40.3	41.4	39.2	35.8
70-74	72.2	63.4	61.0	62.9	59.6	63.6	59.3	55.2
75-79	115.6	105.1	98.7	93.8	96.7	96.4	94.9	85.4
80-84	184.5	176.8	149.5	146.9	140.9	146.5	149.0	135.1
85-89	283.5	265.0	222.4	225.7	} 244.5	{ 247.4	{ 212.4	{ 190.5
90 and over	566.7	380.8	376.2	297.4				

AGE-SPECIFIC DEATH RATES (a) (b) — *continued*

Age group (years)	1920-22	1932-34	1946-48	1953-55	1960-62	1965-67	1970-72 r	1975-77 p					
FEMALES													
Under 1	}	18.8	8.6	7.9	5.1	{ (b) 19.4 1.2	{ (b) 17.7 0.8	{ (b) 16.6 1.0	{ (b) 11.4 0.6				
1- 4													
5- 9		1.3	1.3	0.5	0.5					0.3	0.3	0.3	0.2
10-14		1.2	1.0	0.6	0.3					0.2	0.2	0.2	0.2
15-19		1.3	1.3	0.7	0.7					0.5	0.4	0.6	0.6
20-24	3.1	1.9	1.2	0.7	0.5	0.7	0.5	0.6					
25-29	4.0	2.8	1.5	0.8	0.6	0.7	0.4	0.5					
30-34	4.6	3.1	1.6	1.0	0.8	0.8	0.8	0.6					
35-39	4.9	4.2	2.6	1.5	1.4	1.4	1.3	1.0					
40-44	6.4	5.8	3.1	2.1	2.0	2.1	1.7	1.6					
45-49	8.1	6.4	5.1	3.6	3.3	3.3	3.1	2.8					
50-54	10.6	9.1	6.8	5.9	5.0	5.3	4.6	4.2					
55-59	12.8	10.7	10.1	8.6	7.2	7.6	7.3	6.4					
60-64	17.8	17.3	16.1	13.9	11.4	12.6	11.0	9.9					
65-69	30.5	29.8	24.6	20.7	19.4	20.7	19.0	17.5					
70-74	54.2	44.1	40.8	39.2	35.4	34.6	34.2	27.3					
75-79	96.4	74.4	74.2	67.7	60.6	57.8	56.8	50.2					
80-84	137.1	121.0	117.6	109.7	101.9	100.6	92.5	87.3					
85-89	219.5	192.4	187.5	189.9	} 191.5	{ 182.4	160.0	139.2					
90 and over	478.3	397.2	273.8	285.9			269.8	249.1					
PERSONS													
Under 1	}	21.4	11.4	8.6	6.1	{ (b) 21.2 1.2	{ (b) 19.9 1.0	{ (b) 18.7 1.1	{ (b) 12.9 0.8				
1- 4													
5- 9		1.8	1.4	0.7	0.6					0.4	0.4	0.4	0.3
10-14		1.3	1.2	0.6	0.4					0.3	0.3	0.3	0.3
15-19		1.9	1.5	1.1	1.2					0.8	0.8	1.0	1.0
20-24	3.5	2.2	1.7	1.4	1.2	1.2	1.2	1.1					
25-29	4.0	2.8	1.7	1.4	1.1	1.1	1.0	0.9					
30-34	5.0	3.1	1.9	1.4	1.2	1.3	1.2	1.2					
35-39	5.7	4.1	2.5	1.8	1.8	1.9	1.7	1.5					
40-44	7.2	5.2	3.7	2.7	2.8	2.8	2.3	2.3					
45-49	10.4	7.7	5.7	4.8	4.2	4.3	4.3	4.0					
50-54	14.6	11.5	9.2	7.6	7.4	7.3	6.4	6.3					
55-59	19.6	16.6	13.8	12.3	11.4	12.1	10.9	10.0					
60-64	27.9	23.4	21.4	19.3	17.8	19.3	17.7	15.8					
65-69	41.7	37.0	32.6	30.9	29.1	30.8	29.1	26.3					
70-74	64.3	55.3	50.8	50.4	46.5	47.2	45.7	40.4					
75-79	106.7	91.1	86.6	79.8	76.3	74.1	72.1	64.8					
80-84	162.6	149.7	133.2	125.9	118.0	118.3	113.4	103.5					
85-89	252.0	222.9	204.1	205.8	} 210.7	{ 203.8	178.1	155.0					
90 and over	528.3	389.2	312.3	290.4			284.8	260.9					

(a) Average annual number of deaths at the specified ages during each three-year period per 1,000 of population in the corresponding age group at the relevant census date. Rates for 1965-67 and earlier are based on census counts; those for 1970-72 and later are based on the estimated resident population. Figures for 1960-62 and earlier exclude particulars of full-blood Aborigines; those for 1965-67 and later relate to total population, i.e. including Aborigines. (b) For age *Under 1*, figures for 1960-62 and later represent infant deaths per 1,000 live births registered.

Australian Life Tables. It has been the practice at each census from 1911 onwards to prepare Life Tables representative of the mortality experience of Australia. The mortality of the Australian population for the thirty years from 1881 to 1910 inclusive was investigated in 1911 by the Australian Statistician. Tables were compiled for each State and for Australia as a whole in respect of each sex for each of the decennial periods 1881 to 1890, 1891 to 1900, and 1901 to 1910. At the Census of 1921, Life Tables were prepared by the Australian Statistician from the recorded census population and the deaths in the three years 1920 to 1922. Tables based on data derived from later censuses have been compiled by the Commonwealth Actuary.



The expectation of life of males and females at various ages as revealed by these investigations is shown in the following table.

EXPECTATION OF LIFE (a) — AUSTRALIA: 1881-90 TO 1975-77
(Years)

Age last birthday (years)	1881-90	1891-1900	1901-10	1920-22	1932-34	1946-48	1953-55	1960-62	1965-67	1970-72	1975-77
MALES											
0	47.20	51.08	55.20	59.15	63.48	66.07	67.14	67.92	67.63	67.81	69.56
5	52.86	55.61	57.91	60.43	62.57	63.77	64.32	64.77	64.36	64.52	65.83
10	48.86	51.43	53.53	56.01	58.02	59.04	59.53	59.93	59.50	59.66	60.95
15	44.45	46.98	49.03	51.44	53.36	54.28	54.72	55.07	54.63	54.78	56.06
20	40.58	42.81	44.74	46.99	48.81	49.64	50.10	50.40	49.98	50.19	51.47
25	37.10	38.90	40.60	42.70	44.37	45.04	45.54	45.80	45.40	45.64	46.89
30	33.64	35.11	36.52	38.44	39.90	40.40	40.90	41.12	40.72	40.94	42.18
35	30.06	31.34	32.49	34.20	35.46	35.79	36.25	36.45	36.04	36.23	37.46
40	26.50	27.65	28.56	30.05	31.11	31.23	31.65	31.84	31.44	31.61	32.81
45	23.04	23.99	24.78	26.03	26.87	26.83	27.18	27.38	26.99	27.12	28.32
50	19.74	20.45	21.16	22.20	22.83	22.67	22.92	23.13	22.76	22.87	24.05
55	16.65	17.08	17.67	18.51	19.03	18.84	19.00	19.18	18.83	18.92	20.06
60	13.77	13.99	14.35	15.08	15.57	15.36	15.47	15.60	15.27	15.35	16.40
65	11.06	11.25	11.31	12.01	12.40	12.25	12.33	12.47	12.16	12.21	13.13
70	8.82	8.90	8.67	9.26	9.60	9.55	9.59	9.77	9.52	9.51	10.31
75	6.72	6.70	6.58	6.87	7.19	7.23	7.33	7.47	7.33	7.29	7.91
80	5.11	5.00	4.96	5.00	5.22	5.36	5.47	5.57	5.51	5.52	5.95
85	3.86	3.79	3.65	3.62	3.90	3.84	4.01	4.08	4.07	4.13	4.45
90	2.91	2.91	2.64	2.60	2.99	2.74	2.93	3.02	3.05	3.15	3.45
95	2.16	2.16	1.88	1.86	2.11	1.93	2.10	2.29	2.33	2.60	2.94
100	1.32	1.29	1.18	1.17	1.10	—	—	—	1.82	2.25	2.67
FEMALES											
0	50.84	54.76	58.84	63.31	67.14	70.63	72.75	74.18	74.15	74.49	76.56
5	56.00	58.64	60.80	63.64	65.64	67.91	69.61	70.78	70.64	70.97	72.66
10	51.95	54.46	56.39	59.20	61.02	63.11	64.78	65.92	65.75	66.08	67.75
15	47.54	49.97	51.86	54.55	56.29	58.27	59.90	61.01	60.84	61.17	62.82
20	43.43	45.72	47.52	50.03	51.67	53.47	55.06	56.16	56.00	56.35	57.98
25	39.67	41.69	43.36	45.71	47.19	48.74	50.24	51.32	51.17	51.51	53.12
30	36.13	37.86	39.33	41.48	42.77	44.08	45.43	46.49	46.34	46.67	48.26
35	32.58	34.14	35.37	37.28	38.37	39.46	40.67	41.70	41.56	41.88	43.43
40	29.08	30.49	31.47	33.14	34.04	34.91	36.00	36.99	36.85	37.16	38.67
45	25.56	26.69	27.59	28.99	29.74	30.45	31.44	32.38	32.26	32.55	34.03
50	22.06	22.93	23.69	24.90	25.58	26.14	27.03	27.92	27.83	28.10	29.53
55	18.64	19.29	19.85	20.95	21.58	22.04	22.81	23.63	23.58	23.82	25.19
60	15.39	15.86	16.20	17.17	17.74	18.11	18.78	19.51	19.52	19.74	21.04
65	12.27	12.75	12.88	13.60	14.15	14.44	15.02	15.68	15.70	15.90	17.13
70	9.70	9.89	9.96	10.41	10.98	11.14	11.62	12.19	12.23	12.39	13.52
75	7.24	7.37	7.59	7.73	8.23	8.32	8.69	9.16	9.22	9.36	10.29
80	5.27	5.49	5.73	5.61	6.01	6.02	6.30	6.68	6.72	6.88	7.58
85	3.90	4.12	4.19	4.06	4.30	4.32	4.52	4.79	4.85	5.03	5.49
90	2.98	3.07	2.99	2.91	3.05	3.08	3.24	3.48	3.53	3.73	4.02
95	2.25	2.18	2.10	2.07	2.00	2.14	2.31	2.59	2.66	2.81	3.11
100	1.37	1.23	1.24	1.24	1.02	—	—	—	2.04	2.13	2.72

(a) Figures for years prior to 1965-67 refer to population exclusive of full-blood Aborigines.

MARRIAGES

The number of marriages registered in Western Australia in each of the six years 1976 to 1981 is shown in the following table. Marriages celebrated by ministers of religion are distinguished from those celebrated by civil officers, and the proportions of the total number of marriages which were celebrated by each category of celebrant are also shown.

MARRIAGES REGISTERED

Year	Marriages celebrated by —		All marriages	Proportion celebrated by —	
	Ministers of religion	Civil officers		Ministers of religion	Civil officers
1976	6.316	3.201	9.517	66.37	33.63
1977	5.869	4.194	10.063	58.32	41.68
1978	5.342	4.062	9.404	56.81	43.19
1979	5.052	4.187	9.239	54.68	45.32
1980	5.354	4.240	9.594	55.81	44.19
1981	5.502	4.609	10.111	54.42	45.58

The following table gives details of the average age and of the marital status of bridegrooms and brides in each of the six years to 1981.

AVERAGE AGES OF BRIDEGROOMS AND BRIDES

Year	Average age of bridegrooms (years)				Average age of brides (years)			
	Bachelors	Widowers	Divorced	Total	Spinsters	Widows	Divorced	Total
1976	24.45	58.40	37.99	27.75	21.66	50.26	34.34	24.83
1977	25.09	57.32	38.40	28.60	22.20	48.83	34.50	25.66
1978	24.79	57.82	37.82	28.26	22.04	52.03	34.02	25.34
1979	24.78	57.03	38.11	28.59	22.20	50.69	34.40	25.68
1980	24.89	56.40	37.75	28.41	22.32	49.72	34.43	25.53
1981	24.97	58.53	37.92	28.47	22.38	51.28	34.27	25.55

Marriage Rates. The average annual marriage rates per thousand of mean population for Western Australia and for Australia in each five-year period from 1951 to 1980, as well as the rates for each of the years from 1976 to 1981, are shown in the following table.

MARRIAGE RATES (a)
WESTERN AUSTRALIA AND AUSTRALIA

Period	Average annual rate		Year	Annual rate p	
	Western Australia	Australia		Western Australia	Australia
1951-55	8.4	8.3	1976	8.1	7.8
1956-60	7.4	7.5	1977	8.3	7.4
1961-65	7.4	7.6	1978	7.6	7.2
1966-70	8.9	8.8	1979	7.4	7.2
1971-75	8.4	8.4	1980	7.5	7.4
1976-80 p	7.8	7.4	1981	7.8	7.6

(a) Rates prior to 1966 exclude particulars of full-blood Aborigines. Rates for years prior to 1971 are based on final census counts; those for 1971-75 and later are based on the estimated resident population.

Religious and Civil Marriages. *The Marriage Act* 1961 (Commonwealth) provides that marriages may be celebrated either by ministers of religion registered for the purpose with the Registrar of Ministers of Religion in each State or Territory, by the Registrar-General, his Deputy or other State officers appointed under the Registration of Births, Deaths and Marriages Act (State), or, since 1973, by other persons authorised by the Commonwealth Attorney-General.

The following table, which relates to marriages registered in Western Australia during the period 1976 to 1981, shows the numbers and proportions celebrated by ministers of the principal religious denominations and by civil officers.

RELIGIOUS AND CIVIL MARRIAGES

Category of authorised celebrant	1976	1977	1978	1979	1980	1981	Per cent of total
						Number	
Ministers of religion —							
Registered ministers of recognised religious denominations (a) —							
Church of England in Australia	1,852	1,766	1,608	1,463	1,526	1,579	15.62
Church of Jesus Christ of the Latter Day Saints	24	16	34	33	38	31	0.31
Churches of Christ in Australia	206	219	207	194	148	192	1.90
Congregational Union of Australia (b)	98	56	—	—	—	—	—
Jehovah's Witnesses	55	41	47	52	55	50	0.49
Jewry	12	10	7	12	11	10	0.10
Lutheran Church	44	48	35	45	32	33	0.33
Orthodox Church (c)	96	68	78	80	82	65	0.64
Roman Catholic Church	2,097	1,904	1,771	1,720	1,856	1,997	19.75
Seventh-day Adventist Church	44	39	37	40	36	27	0.27
The Baptist Union of Australia	144	166	136	125	171	129	1.28
The Methodist Church of Australasia (b)	827	475	—	—	—	—	—
The Presbyterian Church of Australia (b)	402	243	34	31	30	29	0.29
The Salvation Army	65	74	65	55	50	82	0.81
Uniting Church in Australia (b)	—	532	1,041	983	1,013	992	9.81
Other	304	183	182	154	201	179	1.77
Total	6,270	5,840	5,282	4,987	5,249	5,395	53.36
Other ministers of religion	46	29	60	65	105	107	1.06
Total	6,316	5,869	5,342	5,052	5,354	5,502	54.42
Civil officers —							
Registrar-General, etc.	2,047	1,656	1,401	1,263	1,046	1,020	10.09
Other persons	1,154	2,538	2,661	2,924	3,194	3,589	35.50
Total	3,201	4,194	4,062	4,187	4,240	4,609	45.58
Total marriages	9,517	10,063	9,404	9,239	9,594	10,111	100.00

(a) Under authority of the Marriage Act. (b) The Uniting Church in Australia was formed in June 1977 by the union of all the Methodist Churches and most of the Congregational and Presbyterian Churches. (c) Includes denominations grouped under this heading in the proclamation made under the Marriage Act.

DIVORCE

The *Family Law Act 1975* (Commonwealth), which came into operation on 5 January 1976, repealed the Matrimonial Causes Act and made new provisions relating to divorce. It also established the Family Court of Australia.

In Western Australia, jurisdiction relating to the *Family Law Act 1975* (Commonwealth) is vested in the Family Court of Western Australia constituted by the *Family Court Act 1975-1979* (State).

The Family Law Act provides that an application by a party to a marriage for a decree of dissolution of the marriage shall be based on the ground that the marriage has broken down irretrievably. A decree of dissolution is made if, and only if, the Court is satisfied that the parties separated and thereafter lived separately and apart for a continuous period of not less than twelve months immediately preceding the date of the filing of the application for dissolution of marriage, provided that the Court is satisfied that there is no reasonable likelihood of cohabitation being resumed.

The Family Court of Western Australia which commenced operation on 1 June 1976 also exercises jurisdiction in matters concerning the adoption of children, and the guardianship, custody or maintenance of children.

In the following table particulars are given of the duration of marriage, i.e. the interval between marriage and the time of dissolution, for marriages dissolved during the six years 1976 to 1981.

DISSOLUTIONS OF MARRIAGE — DURATION OF MARRIAGE

Year of dissolution of marriage	Marriages dissolved after a duration of —							Total marriages dissolved
	Under 5 years	5-9 years	10-14 years	15-19 years	20-24 years	25-29 years	30 years and over	
1976	676	1,540	878	622	469	356	277	4,818
1977	642	1,198	772	498	380	271	214	3,975
1978	614	984	656	420	333	201	179	3,387
1979	654	953	637	439	345	205	164	3,397
1980	644	847	598	366	275	196	147	3,073
1981	704	1,009	673	429	309	204	153	3,481

CHAPTER V — SOCIAL CONDITIONS

Part 1 — Education

PRIMARY, SECONDARY AND TECHNICAL EDUCATION

In Western Australia, education at primary and secondary levels is provided at government schools administered and staffed by the Education Department and at non-government schools, most of which are conducted by the principal religious bodies. Reference to the Technical Education Division of the Education Department will be found later in this Part.

Primary and Secondary School Enrolments

The following tables give a classification according to age of pupils enrolled at government and non-government schools.

GOVERNMENT AND NON-GOVERNMENT SCHOOLS PUPILS CLASSIFIED ACCORDING TO AGE (a)

Age last birthday (b)(c) (years)	Government schools (d)						Non-government schools					
	1976	1977	1978	1979	1980	1981	1976	1977	1978	1979	1980	1981
Under 6	8,504	8,694	8,045	7,462	8,898	8,935	1,493	1,533	1,338	1,343	1,572	1,662
6	19,429	21,337	20,782	19,294	18,408	18,373	3,409	3,524	3,508	3,293	3,360	3,426
7	19,612	19,986	21,655	20,794	19,516	18,671	3,358	3,384	3,566	3,554	3,372	3,500
8	18,694	19,995	20,180	21,708	21,068	19,626	3,196	3,439	3,497	3,693	3,660	3,623
9	18,567	19,121	20,205	20,195	21,585	21,135	3,350	3,298	3,402	3,582	3,790	3,900
10	18,023	18,540	19,119	20,111	20,215	21,654	3,380	3,402	3,413	3,592	3,889	4,210
11	17,969	18,171	18,563	19,051	19,823	20,143	3,569	3,552	3,683	3,591	3,832	4,133
12	17,902	17,754	17,801	17,862	18,048	19,251	4,155	4,113	4,110	4,235	4,396	4,786
13	18,068	17,862	17,170	17,167	17,439	17,645	4,625	4,512	4,601	4,836	4,886	5,126
14	17,568	17,873	17,548	16,970	16,845	17,106	4,544	4,579	4,537	4,525	4,855	4,953
15	13,887	14,228	14,560	14,257	13,476	13,367	4,039	4,065	4,135	4,200	4,118	4,411
16	7,509	7,709	8,074	8,083	7,810	7,598	2,889	3,087	3,117	3,239	3,124	3,102
17	3,526	3,556	3,630	3,715	3,186	3,267	1,669	1,637	1,784	1,769	1,611	1,550
18 and over	299	282	317	360	317	355	134	132	153	129	130	125
Total	199,557	205,108	207,649	207,029	206,634	207,126	43,810	44,257	44,844	45,581	46,595	48,507

(a) Excludes children attending pre-school centres and children in pre-school grades at primary schools. (b) At 1 August for 1976 to 1979 and at 1 July for 1980 and 1981. (c) Children may commence school at the beginning of the year in which they attain the age of 6 years. Except in special circumstances, attendance is compulsory from the age of 6 years and upward to the end of the year in which the child attains the age of 15 years. (d) Includes special schools and classes. Excludes Technical Schools and Colleges. Excludes also part-time students enrolled in the Western Australian Correspondence School.

GOVERNMENT AND NON-GOVERNMENT SCHOOLS PUPILS CLASSIFIED ACCORDING TO AGE AND SEX: AT 1 JULY 1981 (a)

Age last birthday (b) (years)	Government schools (c)			Non-government schools			All schools (c)		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Under 6	4,512	4,423	8,935	806	856	1,662	5,318	5,279	10,597
6	9,452	8,921	18,373	1,700	1,726	3,426	11,152	10,647	21,799
7	9,631	9,040	18,671	1,738	1,762	3,500	11,369	10,802	22,171
8	10,158	9,468	19,626	1,777	1,846	3,623	11,935	11,314	23,249
9	10,913	10,222	21,135	1,946	1,954	3,900	12,859	12,176	25,035
10	11,207	10,447	21,654	2,100	2,110	4,210	13,307	12,557	25,864
11	10,357	9,786	20,143	2,054	2,079	4,133	12,411	11,865	24,276
12	10,057	9,194	19,251	2,396	2,390	4,786	12,453	11,584	24,037
13	9,185	8,460	17,645	2,522	2,604	5,126	11,707	11,064	22,771
14	8,985	8,121	17,106	2,416	2,537	4,953	11,401	10,658	22,059
15	6,751	6,616	13,367	2,141	2,270	4,411	8,892	8,886	17,778
16	3,657	3,941	7,598	1,455	1,647	3,102	5,112	5,588	10,700
17	1,641	1,626	3,267	774	776	1,550	2,415	2,402	4,817
18 and over	168	187	355	59	66	125	227	253	480
Total	106,674	100,452	207,126	23,884	24,623	48,507	130,558	125,075	255,633

(a) See footnote (a) to previous table. (b) See footnote (c) to previous table. (c) See footnote (d) to previous table.

School censuses conducted annually at or about the beginning of August prior to 1980 are now held in July in all States and the internal Territories of Australia. The Western Australian Correspondence School, special schools and classes, schools in institutional homes, hospitals and similar establishments, and pre-school centres are included in the census. Institutions such as business colleges and coaching establishments are excluded.

THE EDUCATION DEPARTMENT

The Education Department is responsible for the organisation and management of the State Government's education programme and is controlled by a Director-General of Education responsible to the Minister for Education. The administrative structure of the Department provides for four Directorates in the administrative area (Administration, Building Services, Finance and Management Services), five Directorates in the professional area (Schools, Educational Services, Staffing, Planning, and Guidance and Special Education) and a Technical Education Division. Special Branches attached to relevant Directorates are concerned with such activities as Aboriginal education, physical education (including swimming instruction), music, drama, art and crafts, audio-visual education, publications, guidance, library services, curriculum development, teacher development, schools computing, planning, buildings and educational research. In addition there is provision for a number of other services which are concerned with particular aspects of the education and welfare of school children, including the School Medical and Dental Service conducted in collaboration with the Department of Public Health.

The Education Department is developing a policy of regionalisation. For administrative purposes there are four metropolitan and nine country regions. Regional directors interpret and implement broad government and departmental policies within their regions and act as channels of communication between the central administration, the teachers and the community in general.

Primary and Secondary Schools

Children may commence school at the beginning of the year in which they attain the age of six years. Except in special circumstances, attendance is compulsory from the age of six years and upward to the end of the year in which the child attains the age of fifteen years. Instruction in the primary school is provided over a seven-year period. A child who makes normal progress completes the course at the age of twelve years and may then enter high school. A Senior High School provides tuition in five years of secondary study leading to the Certificate of Secondary Education. A High School gives instruction in the first three years of the secondary school curriculum culminating in an Achievement Certificate. A District High School is one which provides primary schooling and the first three years of secondary schooling. At some centres where there is no high school, post-primary subjects are taught at the primary school.

The Education Act provides for a Board of Secondary Education to approve courses of study and to certify student achievement in secondary education in Western Australia.

The Achievement Certificate describes the achievement of a student in the first three years of secondary schooling and is issued at the end of Year 10, or earlier if the student leaves school in Years 8 or 9 or before completing Year 10. Each full year's achievement is recorded.

The Certificate of Secondary Education (formerly the Leaving Certificate) is issued to students at the end of Year 12. Certification is based on school assessment moderated by and combined with either a Board-supervised test or the Tertiary Admissions Examination as appropriate to each subject.

Primary and Secondary Curriculum

In primary schools the subjects taught are English, mathematics, social studies, science, physical education, handicrafts, music, art and, in some cases, foreign languages. The teaching of science aims at a better understanding of the child's physical environment. The course is adapted to the conditions of the particular neighbourhood, and so varies between town and country areas. In music expression, choral singing receives most attention, although school orchestras are being developed in some primary and high schools. Advisory teachers working from the central and regional offices, and specialist teachers based in schools, under the direction of the regional superintendents and the specialist superintendent, assist teachers in handicrafts, physical education, art, music, speech, drama, science, English, social studies and mathematics.

At the post-primary level, every student is required to take, until the completion of Year 10, instruction in English, mathematics, science, and social studies, as well as one or more subjects chosen from a range of optional studies.

Education in government schools is secular in character but periods are set aside during which representatives of various religious denominations may attend to give religious instruction. In addition, religious studies are included in the social studies courses.

The figures shown under the heading 'On special duties' represent teachers engaged in activities associated with the specialist branches of the Department, and include all advisory staff referred to above.

GOVERNMENT SCHOOLS

Particulars	At 1 August —				At 1 July —	
	1976	1977	1978	1979	1980	1981
NUMBER OF SCHOOLS						
Primary schools	519	524	533	545	560	560
District high schools	52	52	52	53	53	55
High schools	11	11	12	10	9	10
Senior high schools	58	61	62	66	68	70
Total	640	648	659	674	690	695
NUMBER OF TEACHERS (a)						
Engaged in teaching duties	9,930	10,372	10,951	11,285	11,422	11,457
On special duties	341	354	449	520	497	495
On leave	139	115	142	131	97	85
Total	10,410	10,841	11,542	11,936	12,016	12,037
Males	4,733	4,981	5,267	5,476	5,505	5,601
Females	5,677	5,860	6,275	6,460	6,511	6,436
NUMBER OF PUPILS (b)						
Grade of education —						
Primary	134,822	139,536	142,184	142,128	141,701	141,123
Secondary —						
Years 8, 9 and 10	51,538	52,017	51,338	50,494	50,058	51,282
Years 11 and 12	12,917	13,309	13,858	14,038	14,239	14,046
Ungraded pupils in special classes	280	246	269	369	636	675
Total	199,557	205,108	207,649	207,029	206,634	207,126
Males	103,816	106,155	107,424	106,974	106,425	106,674
Females	95,741	98,953	100,225	100,055	100,209	100,452

(a) Includes persons teaching pre-primary grades. Excludes persons teaching part-time. (b) Excludes part-time students enrolled in the Western Australian Correspondence School.

Audio-visual Materials, Radio and Television

Schools are equipped with projectors, tape-recorders, radios, television sets and sound-reproduction systems. Most secondary schools have video-recording equipment and this has also been supplied to remote and other disadvantaged schools. The Audio-Visual Education Branch, which operates through a number of decentralised outlets, supplies a wide variety of

learning materials on loan and for purchase. The Branch produces many requisites for use in schools, and also obtains materials from commercial sources. The Australian Broadcasting Commission liaises with the Education Department through the Audio-Visual Branch in providing an extensive range of educational radio and television broadcasts for schools.

Student Counselling and Vocational Guidance

Guidance Officers of the Directorate of Guidance and Special Education counsel pre-primary children and school-age students and their parents where the children are experiencing emotional/social problems or learning difficulties, and give career guidance to secondary school students.

In district high schools teachers have been appointed as Careers Advisers to provide career services to country students.

The Department also employs nurses and social workers to provide additional assistance.

Special Education

The Directorate of Guidance and Special Education provides assistance to handicapped children. This includes special schools for physically handicapped, hospitalised, and intellectually handicapped children. A kindergarten and junior school for deaf children is maintained as well as a school for older pupils. A Rural Children's Special Education Unit has been formed to provide special education for rural and isolated children. The Department co-operates with the Crippled Children's Society, the Spastic Welfare Association, the Slow Learning Children's Group and other agencies in providing support for special education programmes.

Education of Intellectually Talented Children

All schools are expected to challenge their most able students by providing them with work in advance of the average. Beyond this, the Department has embarked on a policy of bringing together students of exceptional ability, in order that they may enjoy the benefits of working with their equals. Provision is made for some students in Years 4 and 5 to gather once or twice a week in Special Interest Centres. A small number of students in Years 6 and 7 enrol in full-time extension classes. Nine high schools provide special programmes for students drawn from surrounding schools. Other high schools cater, to a degree beyond normal expectations, for their own intellectually talented students.

The aim of these efforts is to strike a balance between the advantages of peer association and the disadvantages of segregation from the mainstream of the school population.

Distance Education

The Distance Education Centre was formed in 1981 as the result of the amalgamation of the Western Australian Correspondence School and the Isolated Students Matriculation Scheme. It also includes the Isolated Family Correspondence Scheme which supports pre-primary education in the home. The service covers the kindergarten to Year 12 curriculum and supports students who cannot receive an education in the traditional classroom because of isolation, itinerant parents or for social and medical reasons.

The five Schools of the Air located at Carnarvon, Derby, Kalgoorlie, Meekatharra and Port Hedland maintain a close liaison with the Distance Education Centre and use prepared correspondence material to support the broadcast lessons.

Where required, support will be given by the Distance Education Centre to small rural primary and secondary schools where special needs have been identified.

An expanding feature of the service offered by the Distance Education Centre is the field support given to students by visiting tutors and teaching staff. Associated with this service are the itinerant teachers who are based at the Schools of the Air.

Every opportunity is taken to provide isolated students with the opportunity of attending major or mini camps to afford some compensation for the lack of social interaction found in the normal classroom situation. Seminars are also conducted annually to support home-based supervisors.

Education of Aborigines

Children of Aboriginal descent are enrolled in government schools and are offered, as far as is practical, an education similar to that of other children. In schools where a significant proportion of the enrolment is Aboriginal, attention may be directed towards the framing of specific, modified courses. These may be of a special nature or take the form of an alternative programme equal in academic status to the standard course.

In addition, vocationally-orientated programmes for older students, the production of learning materials, the provision of supplementary funding and advisory assistance are implemented through the Department's Regional Offices in liaison with the Aboriginal Education Branch of the Department.

The Branch offers assistance in the education of all Aboriginal children. A pre-primary section for Aboriginal children is administered by the Early Childhood Branch in liaison with the Aboriginal Education Branch. At 1 July 1981 there were 10,293 children of Aboriginal descent at government pre-primary, primary and secondary schools, and 1,966 at non-government schools.

Instruction for adult Aborigines is available under the Adult Aboriginal Education programme conducted by the Technical Education Division.

Agricultural Education

Agricultural education is provided at a number of government schools. Full-time residential courses in agriculture are available at the Narrogin Agricultural College, the Harvey Agricultural Senior High School and the Cunderdin and Denmark Agricultural District High Schools. The two-year curriculum is designed as a continuation of general education to standards equivalent to those of other types of schools. Vocational agriculture subjects are studied under the auspices of the Board of Secondary Education towards the Certificate of Secondary Education. The aim is to produce people capable of becoming leaders in rural communities as well as being successful farmers with an appreciation of the value of scientific methods in agriculture. To be eligible for selection, students must have successfully completed Year 10 and gained a satisfactory report from their previous school concerning their participation in various school activities. Although some preference is given to students who can demonstrate likely ownership-access to farming land, this is not essential. Residential wings at the Cunderdin School have been designed to accommodate both male and female students.

While the schools at Cunderdin, Denmark and Harvey are administered in conjunction with their associated high schools, Narrogin Agricultural College is autonomous and offers short courses for farmers in addition to its other courses.

Residential accommodation for students taking courses in agriculture is also available at Morawa District High School and the special agricultural school at Gnowangerup.

Day instruction in agricultural subjects is provided at an increasing number of senior and district high schools. In Years 9 and 10 Agriculture is taught as an optional subject for the Achievement Certificate and in Years 11 and 12 as the unit Agricultural Studies for the Certificate of Secondary Education.

Most schools providing agricultural instruction have agricultural land attached to them. Advisory committees appointed by the Minister in these schools offer advice concerning management and development of the land.

Diploma and certificate courses in agriculture are provided by the Technical Education Division at Albany, Bunbury, Fremantle and Geraldton Technical Colleges by means of class tuition, or by correspondence through the Technical Extension Service.

In addition to the activities of the Education Department in agricultural education, some private schools offer courses in agriculture.

Technical and Further Education

The Technical and Further Education Division of the Education Department is the main provider of technical and further education (TAFE) in Western Australia. The Division trains managers, supervisors, technicians, skilled tradesmen, professionals and para-professionals, semi-skilled personnel and other kindred support staff required by industry and commerce.

The Division also provides programmes alternative to those of the upper secondary school. These include vocationally related courses, and bridging and second-chance courses for young people from 15 to 19 years of age. Further services are cultural, recreational and leisure programmes for the adult population, and specialist and mid-career or re-training programmes in a wide variety of forms.

Because the State is so large, and its population so unevenly and widely dispersed, the Technical Education Division has developed a variety of ways to make its programmes accessible to students. Some of these are:

Technical Colleges

The Division has eighteen technical colleges: fourteen in the metropolitan area and four in the country. Although these colleges offer a wide range of day and evening courses, each has developed its own special areas of study.

Evening Technical Schools

Unlike colleges, the Division's eight evening technical schools make use of local community facilities including high schools, community halls, company premises and old buildings. Though some day-time classes are available, evening technical schools cater mainly for part-time evening students. Certificate and diploma subjects are provided in some evening technical schools, but complete certificate and diploma courses are not provided.

Technical Centres

The Division has eighty-six technical centres distributed throughout country and metropolitan areas. Making use of a variety of facilities, these centres serve the needs of local communities by providing classes whenever there are sufficient students and staff.

External Studies

External studies are available through the Division's Technical Extension service for students who, because of remoteness or individual limitations (such as physical disabilities) are unable to attend courses at technical colleges, evening technical schools or technical centres. In some cases, these studies may be supplemented by short, intensive courses or attendance at local study centres.

Non-Institutionally-Based Provision

Short intensive courses to meet vocational, small business management and specific industrial training and retraining needs are conducted as required in various locations including company sites. These courses run for periods ranging between one day and eight weeks. The Division is currently developing new forms of delivering these courses in order to meet more effectively the needs of people living in country areas, and also the specific, rather than general, needs of particular companies.

Counselling Service

The Counselling Service, which is open all year round, provides educational, vocational and general guidance to students and prospective students of the Division. It also provides limited consultant services to industry and commerce on the subjects of staff selection, training, evaluation, and related matters.

Adult Migrant and Refugee Education

The Division co-operates with the Commonwealth Departments of Immigration and Ethnic Affairs and Education to provide courses in the English language for adult migrants.

Aboriginal Access Programme

The Division conducts an Aboriginal Access Programme which, although designed mainly to develop literacy among Aboriginal people, includes classes in community obligations, home skills, employment skills and leisure-time activities.

The Division's organisation is a network similar to that of a multi-campus institution. Staff and resources are in large measure movable; that is to say, not permanently dedicated to specific locations. This permits greater use of resources by the public and helps to alleviate the disadvantages of personal immobility and remoteness resulting from the pattern of industrial development in Western Australia.

TECHNICAL AND FURTHER EDUCATION

Particulars	1976	1977	1978	1979	1980	1981
COLLEGES (a)						
Number of — Colleges (b)	14	14	15	15	18	18
Teaching positions (c) —						
Full-time	936	1,038	1,133	1,193	1,228	1,278
Part-time	1,985	2,122	2,113	2,071	2,169	2,450
Student enrolments	61,209	62,020	63,429	65,296	72,695	57,685
SCHOOLS (d)						
Number of — Schools (b)	—	10	11	11	8	8
Teaching positions (c) —						
Full-time	—	16	11	12	9	9
Part-time	—	762	821	833	681	609
Student enrolments	—	22,886	25,709	24,119	21,455	17,750
CENTRES						
Number of — Centres (b)	101	90	91	92	85	86
Teaching positions (c) —						
Full-time	21	12	5	5	5	6
Part-time	1,512	1,005	1,054	990	902	884
Student enrolments	36,066	20,275	18,402	19,433	15,379	10,879
OTHER SERVICES (e)						
Number of — Services (b)	3	3	3	3	3	3
Teaching positions (c) —						
Full-time	41	30	37	37	51	66
Part-time	282	196	275	279	308	322
Student enrolments	3,352	3,730	4,989	4,737	2,884	6,281

TECHNICAL AND FURTHER EDUCATION — *continued*

Particulars	1976	1977	1978	1979	1980	1981
TOTAL						
Number of —						
Colleges, schools, centres, and other services (b)	118	117	120	121	114	115
Teaching positions (c) —						
Full-time	998	1,096	1,186	1,247	1,293	1,359
Part-time	3,779	4,085	4,263	4,173	4,060	4,265
Total	4,777	5,181	5,449	5,420	5,353	5,624
Student enrolments —						
Males	51,728	53,820	54,156	55,293	55,221	45,567
Females	48,899	55,091	58,373	58,292	57,192	47,028
Total	100,627	108,911	112,529	113,585	112,413	92,595

(a) Includes Technical Extension Service. See also footnote (d). (b) At 31 December. (c) At 1 July. A teacher may occupy teaching positions at more than one institution; the number of individual teachers is not available. (d) In 1976 all technical schools were renamed colleges; however, in 1977 certain technical centres were renamed Evening Technical Schools. (e) Adult Aboriginal Education Centres, Counselling Service, and Migrant Education. Excludes Youth Education Classes.

EARLY CHILDHOOD EDUCATION

Pre-primary and pre-school centres are established by the Education Department and by local groups respectively. Attendance is optional at all centres. A year of free voluntary pre-primary education for children of the age of five years has been introduced into the government education system.

The *Education Act 1928-1979*, requires that every person conducting a pre-school centre shall hold a permit issued by the Minister for Education and that every authorised pre-school centre shall be subject to inspection by an officer of the Education Department.

The Early Childhood Branch of the Department is responsible for the co-ordination of early childhood education, the overall administration of pre-primary centres attached to government primary schools, for appointing staff and maintaining advisory services to pre-school centres which are controlled by local parent committees.

PRE-SCHOOL CENTRES

Particulars	At 1 August —		At 1 July —	
	1978 r	1979 r	1980 r	1981
Number of centres —				
Pre-primary	287	355	395	(a) 419
Pre-school	276	225	205	193
Independent pre-schools	}	45	49	{ 15
Non-government schools				
Total	602	625	649	680
Number of staff —				
Trained teachers	703	641	652	690
Teacher aides	843	867	859	791
Total	1,546	1,508	1,511	1,481
Number of children —				
Pre-primary centres	10,182	13,239	14,186	14,972
Pre-school centres	13,504	10,971	9,678	8,966
Independent pre-schools	}	1,604	1,768	{ 650
Non-government schools				
Total	25,267	25,814	25,632	26,110

(a) Includes schools with combined pre-primary/primary classes.

NON-GOVERNMENT SCHOOLS

The non-government schools, which are conducted mainly by religious organisations, provide education from pre-school to the end of secondary school. The curriculum at the primary and secondary levels is substantially the same as that in the government schools, and covers the same number of years.

Schools, Teachers and Pupils

NON-GOVERNMENT PRIMARY AND SECONDARY SCHOOLS

Particulars	At 1 August —				At 1 July —	
	1976	1977	1978	1979	1980	1981
NUMBER OF SCHOOLS						
Denomination of school —						
Church of England	10	10	9	9	9	10
Methodist	3	(a)	(a)	(a)	(a)	(a)
Presbyterian	2	(a)	(a)	(a)	(a)	(a)
Roman Catholic	149	146	144	147	147	143
Uniting Church	—	5	5	5	5	5
Other denominations	9	10	10	12	13	13
Non-denominational	14	17	19	23	24	35
Total	187	188	187	196	198	206
NUMBER OF TEACHERS (b)						
Denomination of school —						
Church of England	264	275	283	301	311	350
Methodist	137	(a)	(a)	(a)	(a)	(a)
Presbyterian	102	(a)	(a)	(a)	(a)	(a)
Roman Catholic	1,409	1,494	1,553	1,618	1,677	1,684
Uniting Church	—	243	257	265	269	279
Other denominations	50	53	53	66	67	62
Non-denominational	55	62	68	75	87	111
Total	2,017	2,127	2,214	2,325	2,411	2,486
NUMBER OF PUPILS						
Denomination of school —						
Church of England	4,231	4,183	4,196	4,376	4,589	5,010
Methodist	2,157	(a)	(a)	(a)	(a)	(a)
Presbyterian	1,561	(a)	(a)	(a)	(a)	(a)
Roman Catholic	33,691	33,997	34,339	34,553	35,266	36,255
Uniting Church	—	3,791	3,926	4,091	4,196	4,254
Other denominations	1,120	1,114	1,173	1,215	1,205	1,191
Non-denominational	1,050	1,172	1,210	1,346	1,339	1,797
Total	43,810	44,257	44,844	45,581	46,595	48,507
Grade of education —						
Primary	24,678	24,851	25,104	25,395	25,855	26,998
Secondary — Years 8, 9 and 10 (c)	13,538	13,721	13,930	14,182	14,574	15,314
Years 11 and 12	5,594	5,685	5,810	6,004	6,166	6,195
Total	43,810	44,257	44,844	45,581	46,595	48,507
Males	21,005	21,328	21,633	22,084	22,734	23,884
Females	22,805	22,929	23,211	23,497	23,861	24,623

(a) From June 1977 the Methodist and Presbyterian schools combined with the Uniting Church. (b) Excluding persons on leave without pay and persons teaching part-time. (c) Includes pupils in special classes not classified by year of study.

POST-SECONDARY EDUCATION

Post-secondary education in Western Australia is provided through the two Universities (Murdoch University and the University of Western Australia), the Western Australian Institute of Technology, the Colleges established under the *Colleges Act 1978-1980* and the technical colleges and centres of the Education Department.

THE WESTERN AUSTRALIAN POST-SECONDARY EDUCATION COMMISSION

The Western Australian Post-Secondary Education Commission was established under the terms of the *Western Australian Post-Secondary Education Act 1970-1979*, to advise the Government, post-secondary education institutions and the Commonwealth Tertiary Education Commission on the planning, co-ordination, development and financing of post-secondary education. Specific matters on which the Commission provides advice include establishment and location of new post-secondary education institutions; acquisition and reservation of sites; levels of financial support requested by the institutions; assessment of proposals for the introduction of new courses of study; accreditation of new and existing courses; salaries and other conditions of employment of academic and non-academic staff of the institutions; and criteria for entrance to the institutions.

The Commission consists of a Chairman and eleven other members appointed by the Governor on the recommendation of the Minister for Education. The Chairman is appointed for a term not exceeding seven years, and the other members for terms not exceeding four years. At least three, but not more than four, of these members are to be members of staff, whether academic or otherwise, of a post-secondary education institution.

THE TERTIARY INSTITUTIONS SERVICE CENTRE

The Tertiary Institutions Service Centre was set up in 1975 by agreement between the tertiary institutions for the purpose of: (a) conducting the Tertiary Admissions Examination in accordance with the policy laid down by the Tertiary Admissions Examination Committee; (b) processing applications for admission to the institutions; and (c) carrying out such other functions as agreed by the institutions. Under the terms of the agreement a management committee comprising representatives of the tertiary institutions is responsible for the activities of the Centre.

The Tertiary Admissions Examination Committee comprises members nominated by the Education Department, tertiary education institutions and non-government schools. In conjunction with the Board of Secondary Education the Committee has established a Joint Syllabus Committee for each subject of the examination. These committees are responsible for considering and making recommendations relating to all syllabus matters.

An examining panel, usually of three members is responsible for the setting and marking of papers and for advising on matters concerning examination format and procedures.

Results from the Tertiary Admissions Examination are used in selecting students for admission to a tertiary institution. The results also form a component of the grades shown on the Certificate of Secondary Education which is issued by the Board of Secondary Education.

Applicants seeking admission to a first year undergraduate course (or later years in the case of Murdoch University) or to a Diploma in Education course apply through a joint system operated by the Centre. Applicants list four preferences from all the tertiary courses available and offers are then made by the institutions for each course on the basis of a ranked order.

THE COLLEGES

Multi-level post-secondary education colleges may be established by the Minister for Education, on the advice of the Western Australian Post-Secondary Education Commission, under the provisions of the *Colleges Act 1978-1980*. Such colleges may, with the Minister's approval, provide advanced education, technical and further education, and education at other levels in specified circumstances.

On 1 January 1982 the four metropolitan colleges — Churchlands, Claremont Teachers, Mount Lawley and Nedlands, were amalgamated to form the Western Australian College of Advanced Education. Individually, each is now known as a campus. In April 1982 the total enrolment was 8,935, comprising 3,573 full-time, 4,123 part-time and 1,239 external

students. In the country, Hedland College and Karratha College are situated in the Pilbara region in the north-west of the State. Both commenced operations in 1980, and provide courses in the technical and further education sector, but in future may provide higher education for local students in co-operation with institutions based in the Perth metropolitan area. Hedland and Karratha Colleges also provide a focus for educational and cultural activities within their respective communities.

Churchlands Campus

Churchlands was established in 1972 and offers courses in Business Studies and in Teacher Education. The following courses were available in 1982:

Graduate Diploma	Mathematics Education (Primary), Music Education (Primary), Remedial Education, Science Education (Primary), Finance, and Management Studies, Early Childhood Studies.
Bachelor's Degree	Business (Accounting, Administration, Financial Management Economics, Information Management and Information Processing), Education (Early Childhood, Primary).
Diploma	Teaching (Early Childhood, Primary).

In April 1982 there were 3,065 students enrolled of whom 1,224 were full-time and 1,841 were part-time.

Claremont Campus

Claremont was established in 1902 as the State's first teachers college. In recent years it has been able to diversify and in 1982 it offered the following courses:

Graduate Diploma	Education (Primary), Reading Education, Speech and Drama Education, Religious Education, Career Education and Children's Literature
Bachelor's Degree	Education (Primary)
Diploma	Teaching (Primary), Teaching (Conversion)
Associate Diploma	Health Education

There were 1,676 students enrolled in full-time, part-time and external courses in 1982.

Mount Lawley Campus

Mount Lawley was established in 1970 and in 1982 offered the following courses:

Graduate Diploma	Art Education, Educational Technology, Intercultural Studies (Aboriginal Studies, Ethnic Studies, Migrant Studies), Language Studies (Language Arts, Modern Language Education, Teaching English as a Second Language), Physical Education, Special Education, Computer Education and Social Studies Education.
Bachelor's Degree	Education
Diploma	Teaching (Primary), Performing Arts (Dance), Performing Arts (Theatre), Music Teaching, Performing Arts (Music)
Associate Diploma	Applied Arts and Sciences, Performing Arts (Dance), Performing Arts (Music)
Advanced Certificate	Dance Studies
Certificate	Music

The number of enrolments in full-time and part-time courses at April 1982 was 2,349.

Nedlands Campus

Nedlands was established in 1967 as the Western Australian Secondary Teachers College to train future secondary-school teachers. It became the Nedlands College from January 1979 in accordance with the *Colleges Act 1978*. In 1982 the Campus offered the following courses:

Graduate Diploma	Education (Secondary), Recreation, Secretarial Studies
Bachelor's Degree	Education (Secondary), Applied Science (Recreation)
Diploma	Applied Science (Recreation), Teaching (Secondary)
Associate Diploma	Library Media, Recreation

Some students enrolled at the Campus earn academic credit through approved studies undertaken at other tertiary institutions. The total number of enrolments in 1982 was 1,845.

Hedland College

Hedland College was established in 1980 to offer courses in Apprentice and Post Trade studies, other fields in Technical and Further Education (TAFE) and to provide local assistance to students studying advanced education.

The following College courses were offered in 1982.

Certificate	Office and Secretarial Studies.
Apprenticeship	Automotive Mechanics, Electrical Fitting, Electrical Installing, Fitting and Machining, Mechanical Fitting, Metal Construction, Welding.

Also in 1982 the College acted as agent in Port Hedland in providing tuition toward a computer methods unit of the Western Australian Institute of Technology, as well as providing tuition in Port Hedland and Newman for the following TAFE Awards:

Certificate	Accounting, Art Studies, Commercial Studies, Computer Programming, Engineering (various), Industrial Electronics, Personnel Management, Welding (various).
Diploma	Accounting, Art Studies, Commercial Studies, Personnel Management, Public Administration, Computer Programming.
Licence	Department of Labour and Industry — Riggers, S.E.C. 'A' Grade; Membership Institute of Mechanical Engineers — Mechanical, Electrical; Department of Transport — Private and Commercial Pilots Licence (Theory Subjects).

In 1981 the College enrolled 1,762 students of whom 1,452 were enrolled at Hedland, 279 at Newman and 31 at Marble Bar.

Karratha College

Karratha College, established in 1980, offered the following courses in 1982.

TAFE Certificate	Accounting, Art Studies, Commercial Practice, Engineering Drafting
TAFE Diploma	Accounting, Business Administration, Engineering, Secretarial Practice
Apprenticeship	Automotive Mechanics, Boilermaker, Electrical Fitting and Installing, Fitting and Machining, Welding
Pre-apprenticeship	Covering the above trades
Advanced Education	Bachelor of Business

The College also provides counselling and tutorial assistance to external students in university and advanced education programmes.

In 1981, there were 1,215 students enrolled at the College, which conducts classes in Dampier, Paraburdoo, Tom Price and Wickham, as well as in Karratha.

THE WESTERN AUSTRALIAN INSTITUTE OF TECHNOLOGY

The Western Australian Institute of Technology is a college of advanced education, established in terms of the *Western Australian Institute of Technology Act 1966-1981* as an autonomous body under the control of a governing council. The main functions of the Institute, as set out in the Act, are to provide facilities for higher specialised instruction and to advance training in the various branches of technology and science; to aid the advancement, development and practical application to industry of science or any techniques; and to encourage and provide facilities for the development and improvement of tertiary education whether on a full or part-time basis to meet the needs of the community.

Buildings for the Institute were commenced in 1963 on a site of about 109 hectares at Bentley, approximately eleven kilometres from the Perth city centre, and the initial group of buildings was officially opened on 17 August 1966. The administration and associated buildings were officially opened on 11 October 1968.

FinanceTHE WESTERN AUSTRALIAN INSTITUTE OF TECHNOLOGY — FINANCE (a)
(\$'000)

Particulars	1975	1976	1977	1978	1979	1980
INCOME						
Income for specific capital purposes (b) —						
Commonwealth Government grants	6,815	1,924	3,680	3,761	1,444	613
State Government grants	460	—	—	—	—	—
Total	7,275	1,924	3,680	3,761	1,444	613
Income for other purposes —						
Commonwealth Government grants	24,029	26,719	29,195	30,321	32,912	35,958
State Government grants	105	—	—	—	—	—
Donations and endowments	11	26	128	29	107	158
Other	1,542	1,247	1,810	3,849	7,388	6,408
Total	25,687	27,992	31,133	34,199	40,407	42,524
TOTAL INCOME	32,962	29,916	34,813	37,960	41,851	43,137
EXPENDITURE						
Salaries and wages	16,504	18,228	20,892	22,623	24,144	26,841
Library	479	320	451	507	564	598
Buildings, grounds and equipment	6,617	1,937	3,673	4,317	2,429	2,387
Minor equipment	799	973	1,438	820	(c)	(c)
Sundry auxiliary expenditure	6,453	7,413	8,673	9,980	14,961	11,448
TOTAL EXPENDITURE	30,852	28,871	35,127	38,247	42,098	41,274

(a) The Commonwealth Government assumed full financial responsibility for tertiary education with effect from 1 January 1974 and tuition fees were abolished. State Government grants shown for 1975 represent amounts outstanding from previous years or grants made for specific purposes such as research. (b) Income received specifically for new buildings, major alterations and additions to buildings, installation of services, purchase of land and buildings and major equipment. (c) From 1979 included with *Buildings, grounds and equipment*.

Courses

The Institute conducts regular courses leading to an associate diploma, diploma, bachelor's degree, graduate diploma or master's degree qualification. The courses vary in duration according to the level and may be undertaken by full-time or part-time studies. It is also possible to study some courses on an external (correspondence) basis. The normal entrance requirement for undergraduate courses is that a student shall have attained an aggregate of scaled marks exceeding a determined minimum in the Tertiary Admissions Examination. The aggregate is calculated on the basis of scaled marks gained in five subjects, one of which must be English or English Literature. Other avenues for admission include selection on the basis of school assessment, certain qualifications obtained through the Technical Education Division, or other qualifications equivalent to Tertiary Admission Examination standards. Special

provisions exist by means of a Mature Age Scheme for admitting those over the age of twenty-one years who do not meet the normal entrance requirements.

The teaching work of the Institute is organised under four Divisions namely Arts, Education and Social Sciences; Business and Administration; Engineering and Science; and Health Sciences.

The Institute offered degrees for the first time in 1973 and it currently offers degrees in most areas of study. A range of graduate diploma programmes, and masters' degrees are currently on offer in the Business, Chemistry, Education, Engineering, English, Health Sciences, Library Studies, Metallurgy, Physics, Pharmacy, Planning, Science Education, and Surveying and Mapping disciplines.

School of Mines of Western Australia

The School of Mines of Western Australia was established at Coolgardie in 1902 and was transferred to Kalgoorlie in the following year. Control of the School of Mines, formerly part of the Department of Mines, passed to The Western Australian Institute of Technology in January 1969 and formed the nucleus of the School of Mining and Mineral Technology established in 1975.

Undergraduate courses are available in Accounting, Engineering (Civil, Electrical, Mechanical, Mining), Metallurgy (extractive), Mine Surveying, Mine Ventilation and Mining Geology. These courses extend over three or four years of full-time study or the part-time equivalent. However, after the first year, students in Civil and Mechanical Engineering must transfer to the Bentley campus of the Institute. An associate diploma course in Mining and Mineral Technology extending over two years of full-time study or the part-time equivalent, is also provided. The total number of students enrolled in 1980 was 271 and 287 in 1981.

Through the Kalgoorlie Metallurgical Laboratory, the School undertakes metallurgical investigations as well as assays for gold or for other metals. Free assays and mineral determinations are made available for *bona fide* prospectors.

The School has a geological museum which is open to the public and contains rocks and minerals from many parts of Australia and elsewhere.

Muresk Agricultural College

Muresk Agricultural College, situated about thirteen kilometres south of Northam in the Avon Valley, was established by the Department of Agriculture in 1926. Control of the College was transferred to the Western Australian Institute of Technology from the Department of Agriculture in January 1969.

The College offers three tertiary level courses. There are two Associate Diploma courses, one in Agriculture and the other in Equine Stud Management. Both are of two years' duration and fully residential. The third course, a Bachelor of Business (Agriculture), is a full-time bachelor degree programme of three and a half years' duration. These courses are designed to give a sound scientific, technical and managerial training suitable for those wishing to become farm owners or managers, or to work in industries servicing agriculture. The subjects studied are Plant Sciences and Husbandry, Animal Sciences and Husbandry, Agricultural Engineering, Farm Management, Farm Mechanisation, Soil Science, Humanities and Practical Farm Work. Instruction is given by means of lectures, assignments, laboratory and workshop practical work, demonstrations, tutorials, day tours to farms and research stations, extended tours into the agricultural areas, and practical farming on the College estate and on a nearby project farm.

The estate of some 900 hectares is devoted to mixed farming and provides the students with an opportunity to gain a considerable amount of practical experience by observation, demonstration and actual participation in a wide variety of farming activities. Use is made of the College facilities for various research projects.

Numerous short courses are held at the College, including in-service training schools for personnel of the Department of Agriculture and for field and service staff of agricultural firms.

The number of students enrolled at the College in 1981 was 285.

Teachers, Students, and Courses Completed

The following table gives particulars of teaching staff in each of the years 1976 to 1981. The number of students taking and completing courses is also shown.

THE WESTERN AUSTRALIAN INSTITUTE OF TECHNOLOGY

Particulars	1976	1977	1978	1979	1980	1981
NUMBER OF TEACHING STAFF (a)						
Full-time —						
School and department heads	37	36	38	42	41	46
Senior lecturers	129	122	143	145	142	148
Lecturers	278	295	273	264	267	273
Assistant lecturers, tutors, demonstrators, etc.	88	81	100	93	104	98
Total, Full-time	532	534	554	544	554	565
Part-time (b)	139	115	98	125	147	103
NUMBER OF STUDENTS IN APPROVED COURSES (a)						
Full-time	4.775	4.776	4.921	4.978	5.024	5.106
Part-time —						
Internal	4.983	5.093	5.022	5.115	5.140	5.428
External	1.086	1.217	1.252	1.282	1.333	1.351
Total	10.844	11.086	11.195	11.375	11.497	11.885
Males	7.126	7.139	7.012	6.983	6.909	7.090
Females	3.718	3.947	4.183	4.392	4.588	4.795
NUMBER OF STUDENTS WHO COMPLETED COURSES						
Field of study —						
Agriculture	33	30	35	26	35	29
Applied science	94	104	127	103	133	122
Art and design	80	73	85	87	112	90
Building, surveying, architecture	54	121	138	123	138	122
Commercial and business studies	342	346	370	391	442	433
Engineering and technology	142	123	176	253	124	129
Liberal studies	335	339	338	360	410	342
Para-medical	217	253	322	321	344	386
Teacher education	146	229	273	262	300	252
Total	1.443	1.618	1.864	1.926	2.038	1.905

(a) At 30 April. (b) Expressed on the basis of full-time staff equivalents.

THE UNIVERSITY OF WESTERN AUSTRALIA

University education first became available in Western Australia in 1898, with the formation of the Extension Committee of the University of Adelaide by which facilities were provided for external studies in courses for degrees in Arts and Science. The first step towards the establishment of a university in Western Australia was taken in 1904, when a University Endowment Act providing for the incorporation of a trust to administer funds for the purpose was passed by the State Parliament. Following a favourable report made by a Royal Commission under the chairmanship of Dr (later Sir Winthrop) J. W. Hackett, the University was established by the University of Western Australia Act of 1911. Teaching began in 1913 in subjects related to the Faculties of Arts, Science and Engineering. Additional Faculties established since that time are those of Law (1927), Agriculture (1936), Dental Science (1946), Education (1947), Economics (1954), Medicine (1956) and Architecture (1966). The Faculty of Economics was reconstituted as the Faculty of Economics and Commerce in 1961.

Matriculation Requirements

A candidate for matriculation is required to take subjects at the Tertiary Admissions Examinations selected in accordance with the Matriculation Regulations, and to obtain an

aggregate of marks not less than a minimum determined by the University. The marks included in the aggregate of a full-time student must have been obtained in a single year, while those included in the aggregate of a part-time student must have been obtained during a period of not more than three consecutive years.

Matriculant status may be granted to an applicant who has satisfied the examination requirements of another university in Australia, New Zealand or the United Kingdom, or of any other university recognised by The University of Western Australia, qualifying him for matriculation.

The regulations also provide that a person over the age of twenty-one years who has not qualified for matriculation may be admitted provisionally to a degree course if he is able to demonstrate that, by reason of his education, aptitude or intelligence, there is a reasonable prospect of his being able to assimilate and benefit from the course. Some faculties use the University's Mature Age Examination (which consists of English or English Literature and one other approved subject in the Tertiary Admissions Examination), while other faculties accept other evidence.

Degrees

Degrees are granted in the Faculties of Agriculture, Architecture, Arts, Dental Science, Economics and Commerce, Education, Engineering, Law, Medicine and Science.

Courses for the pass degrees of Bachelor of Arts, Bachelor of Economics, Bachelor of Commerce, Bachelor of Physical Education and Bachelor of Science extend over a period of not less than three years; pass and honours courses for the degrees of Bachelor of Music, Bachelor of Music Education, Bachelor of Education, Bachelor of Engineering and Bachelor of Science in Agriculture over not less than four years; and that for the degree of Bachelor of Architecture, over not less than five years. The course for the degree of Bachelor of Dental Science extends over not less than four years after successful completion of one year's study, including certain compulsory units, in another faculty; the course for the degree of Bachelor of Jurisprudence extends over a period of not less than three years, following successful completion of the first year of a course in any other faculty and that for the degree of Bachelor of Laws over a period of not less than one further year. Honours degree courses in Arts, Commerce, Economics, Education, Music, Physical Education and Science are usually of four years' duration. The course in the Faculty of Medicine for the degrees of Bachelor of Medicine and Bachelor of Surgery extends over six years. The medical and dental courses may be interrupted to permit selected students to take a one-year course for the honours degree of Bachelor of Medical Science or Bachelor of Science in Dentistry respectively. The course for the degree of Bachelor of Psychology occupies not less than one year after completion of three years of a course for the degree of Bachelor of Arts or Bachelor of Science. The course for the postgraduate degree of Bachelor of Social Work extends over a period of not less than two years after successful completion of a first degree course.

Other degrees conferred by the University are those of Master of Arts and Doctor of Letters, Master of Music, Master of Music Education and Doctor of Music, Master of Psychology, Master of Laws and Doctor of Laws, Master of Education, Master of Physical Education, Master of Economics, Master of Commerce, Master of Business Administration, Master of Industrial Relations, Master of Japanese Studies, Master of Science and Doctor of Science, Master of Science Education, Master of Engineering Science, Master of Engineering and Doctor of Engineering, Master of Science in Agriculture and Doctor of Science in Agriculture, Master of Science in Natural Resource Management, Master of Dental Science and Doctor of Dental Science, Master of Surgery and Doctor of Medicine, Master of Architecture, Master of Building Science and Master of Social Work. The degree of Doctor of Philosophy is given for research in all faculties.

Diploma Course

In addition to the above degree courses, a postgraduate Diploma in Education course is available.

University Government

The original Act provided that the Senate and Convocation should constitute the governing authority with power to make statutes for 'the management, good government and discipline of the University'.

The Senate consists of twenty-five members, of whom six are appointed by the Governor, six are elected by Convocation, four are elected by the full-time teaching staff, two are elected by students, three are *ex officio* members (the Vice-Chancellor of the University, the Director-General of Education or his appointee and the President of the Guild of Undergraduates), and four are co-opted members. Convocation consists of graduates of the University and such other persons as are eligible for membership under the provisions of the University of Western Australia Act.

Since an amendment to the Act in 1944 the Senate alone has been the governing authority and is responsible, subject to the Act and the statutes, for the entire control and management of the University. Statutes approved by the Senate are submitted to Convocation for its consideration, and although Convocation may suggest amendments the Senate is not bound to accept them. The Act requires that statutes shall be submitted to the Governor for approval, after which they have the force of law.

The Chancellor is the titular head of the University. He is elected annually by the Senate from among its members and presides over its meetings. The Vice-Chancellor is the chief executive officer of the University and is appointed by the Senate for a period not exceeding ten years, at the end of which term he is eligible for reappointment. At meetings of Convocation the chairman is the Warden who is elected annually by Convocation from among its members.

The Guild of Undergraduates is constituted under the Act as a voluntary association of the University students 'for furthering of their common interests, and shall be the recognised means of communication between the students and the governing authority of the University'. The government of the student Guild is vested in its Council, to which members are elected in accordance with regulations made by the Guild.

Student Fees, Allowances and Scholarships

The Royal Commission appointed to inquire into the establishment of a University recommended that teaching should be free and suggested that 'if fees are found to be necessary, they should be on the lowest possible scale'. This policy was adopted and tuition fees were not charged, except in the case of a limited number of students, until 1962 when fees were introduced to assist in meeting the increasing costs of operation resulting from a rapidly growing student enrolment and to enable the University to take full advantage of financial aid available under Commonwealth legislation. The Commonwealth Government assumed full financial responsibility for tertiary education with effect from 1 January 1974 and tuition fees were abolished. However, all students of the University must pay an annual amenities and services fee.

Financial assistance is given to students by the Commonwealth Government under the Tertiary Education Assistance Scheme and by means of postgraduate awards, to which reference is made later in this Part. In addition, the University makes awards, from its own funds, of research studentships for postgraduate study which are competed for by students holding no other award and having an Honours degree of second class (Division A), or higher, standard. Graduates may also apply for Hackett Studentships for overseas study which, in addition to other financial benefits, carry a travel grant. Some large private industrial concerns also make awards for study at postgraduate level.

Finance

The following table relates to the income and expenditure of The University of Western Australia in each year from 1976 to 1981.

THE UNIVERSITY OF WESTERN AUSTRALIA — FINANCE (\$'000)

Particulars	1976	1977	1978	1979	1980	1981
INCOME						
Income for specific capital purposes (a) —						
Commonwealth Government grants	775	775	652	117	274	285
State Government grants	(b) — 13	—	—	—	—	—
Total	762	775	652	117	274	285
Income for other purposes —						
Commonwealth Government grants	32,285	35,900	38,515	41,564	45,659	53,106
State Government grants	209	690	518	521	856	1,020
Donations and endowments	2,066	2,517	2,817	3,851	4,372	5,187
Student fees (c)	28	28	30	28	31	37
Other	2,959	3,813	4,241	3,888	4,568	5,406
Total	37,547	42,948	46,121	49,852	55,486	64,756
TOTAL INCOME	38,309	43,723	46,773	49,969	55,760	65,041
EXPENDITURE						
Teaching and research	25,942	29,284	31,974	34,410	38,734	44,161
Administration and general overhead	3,862	4,131	4,511	4,669	5,449	6,026
Libraries	2,355	2,636	2,817	3,086	3,399	3,768
Buildings, premises, grounds	4,447	4,069	3,751	4,127	4,839	5,531
Sundry auxiliary expenditure	1,568	1,781	2,097	2,072	2,427	2,647
TOTAL EXPENDITURE	38,174	41,901	45,150	48,364	54,848	62,133

(a) Income received specifically for new buildings, major alterations and additions to buildings, installation of services, purchase of land and buildings and major equipment. (b) Unexpended funds returned. (c) The Commonwealth Government assumed full financial responsibility for tertiary education and abolished students fees with effect from 1 January 1974. Student fees shown for 1976 and later years represent grants made for specific purposes such as research and charges incurred by students such as late enrolment fees.

Colleges and Hall of Residence

There are five residential colleges within the University. Four of the colleges take both men and women students; these are Kingswood and St Columba Colleges, both conducted by the Uniting Church of Australia, St Thomas More College, a foundation of the Roman Catholic Church and St George's College which is conducted by the Anglican Church. St Catherine's College is a non-denominational college for women students.

Currie Hall is a non-denominational hall of residence for men and women students.

Tuition

In addition to the normal lectures and tutorials for full-time students, courses for part-time students are offered in the Faculties of Arts, Education, Economics and Commerce, and Science. Certain education subjects may be taken at the Churchlands, Claremont, Mount Lawley and Nedlands campuses of the Western Australian College of Advanced Education under affiliation arrangements with the University.

Staff, Students and Students Completing Courses

The following table gives particulars of teaching staff and students in each of the years from 1976 to 1981. The number of students taking and completing courses during each of these years is also shown. Further information is available from the publications *University Statistics: Part 1 — Students* (Catalogue No. 4208.0) and *Part 2 — Staff and Libraries* (Catalogue No. 4209.0), which are issued annually by the Australian Statistician, Canberra.

THE UNIVERSITY OF WESTERN AUSTRALIA

Particulars	1976	1977	1978	1979	1980	1981
NUMBER OF STAFF (a) (b)						
Teaching —						
Full-time —						
Professors	67	74	72	72	76	71
Associate professors, readers	64	70	72	73	80	89
Senior lecturers	194	189	199	196	198	190
Lecturers, teaching registrars	160	170	170	166	146	127
Senior tutors and demonstrators, assistant lecturers	108	100	108	97	90	86
Demonstrators, tutors, teaching fellows	41	36	33	33	18	17
Total	634	639	654	637	608	580
Part-time (c) —						
Lecturing	12	11	10	11	11	11
Tutoring/demonstrating	88	80	83	74	75	76
Total (c)	100	91	94	86	86	87
Research —						
Full-time	76	99	98	105	122	147
Part-time (c)	—	—	—	—	—	—
Other —						
Full-time	1,420	1,412	1,428	1,398	1,376	1,427
Part-time (c)	95	27	62	83	76	79
NUMBER OF STUDENTS (a)						
Internal —						
Full-time	6,364	6,640	6,597	6,528	6,548	6,502
Part-time	3,403	3,167	3,118	3,079	3,191	3,280
External	37	58	41	32	52	53
Total	9,804	9,865	9,756	9,639	9,791	9,835
Males	6,256	6,184	6,020	5,885	5,858	5,673
Females	3,548	3,681	3,736	3,754	3,933	4,162
NUMBER OF STUDENTS WHO COMPLETED COURSES (d)						
Field of study —						
Agriculture, forestry	27	15	38	28	31	33
Architecture, building	21	14	9	24	14	16
Dentistry	18	27	22	23	25	24
Economics, commerce, government	245	300	286	268	259	250
Education	374	336	352	300	289	324
Engineering, technology	121	103	112	112	106	95
Fine arts	11	10	11	16	13	14
Humanities	286	256	240	265	291	294
Law	140	186	176	170	182	171
Medicine	137	128	123	134	164	138
Natural sciences	277	250	288	253	303	306
Social and behavioural sciences	208	230	275	315	310	264
Total	1,865	1,855	1,932	1,908	1,987	1,929

(a) At 30 April. (b) Figures for 1981 are preliminary. (c) Figures for part-time staff have been converted to a full-time equivalent on the basis of 250 hours per annum for lecturers, 700 hours per annum for tutors and demonstrators and 35 hours per week for all other staff. (d) Year ended 30 June.

Research

More than \$9.2 million was spent on research at the University during 1981. This sum comprised funds provided by the Commonwealth Government through the Tertiary Education Commission, grants from agencies such as the Australian Research Grants Committee and the National Health and Medical Research Council, and bequests and benefactions from private industry and members of the public. Of the total figure, over \$2.1 million was applied to general support of research activities, \$5.9 million to particular research projects financed by outside agencies, and \$1.2 million to projects covered by bequests. Salaries of staff engaged in research and the overheads involved are not included in these figures.

For the most part the research undertaken is 'pure' research, that is, research aimed simply at deepening and broadening man's knowledge of himself and his world: this is a fundamental and normal activity of a university which can very often lead to significant practical applications.

University Extension

The Adult Education and Extension Committee was established by the Senate of the University in 1968 as a result of the reorganisation of the former Adult Education Board which had been created by the University in 1928. In 1972 the Committee was renamed the Extension Committee and more emphasis is now placed on University Extension activities. The policies of the Committee are implemented by the Director of University Extension. The headquarters of the organisation are at the University.

University Extension is responsible for general courses for adults at university level, for postgraduate and refresher courses and for certain cultural activities. It works in close liaison with university departments and faculties and with professional organisations in the community. University Extension also conducts conferences, symposia, seminars and residential schools.

Classes are conducted at the University, and various other activities are arranged in both the metropolitan and country areas. These are generally non-vocational in character. An annual Summer School is also held at the University.

MURDOCH UNIVERSITY

Murdoch University is established under the provisions of the *Murdoch University Act 1973-1980*, which came into operation on 1 July 1973. The University is named in honour of the distinguished Australian essayist and biographer, Sir Walter Murdoch (1874-1970), foundation Professor of English at The University of Western Australia (1912-1939) and later Chancellor (1943-1948). A ceremony to mark the inauguration of the University was held on 17 September 1974, the centenary of his birth.

Admissions. The first nineteen postgraduate students were accepted in 1974 and some 600 undergraduate and forty postgraduate students were accepted in 1975. The University has a flexible policy concerning admissions. In determining the eligibility of a prospective student, consideration is given to examination results, information obtained from school reports, the results of selection tests and interviews with applicants. However, in some courses, particularly in the physical and biological sciences and in mathematics, some prior knowledge of certain subjects is considered necessary.

Schools of Study. The University is organised on the basis of schools of study which have both academic and administrative responsibilities. The following schools have been established: Education; Environmental and Life Sciences; Human Communication; Mathematical and Physical Sciences; Social Inquiry; and Veterinary Studies.

Programmes of Study. Degree programmes offered in 1982 were in Applied Veterinary Medicine, Biology, Chemistry, Chinese Studies, Communication Studies, Contemporary Asian Studies, Economics, Education Studies, Environmental Science, General Studies, History, Mathematics, Mineral Science (Extractive Metallurgy), Physics, Population and World Resources, Psychology, Social and Political Theory, South-east Asian Studies, Teacher Education, Veterinary Biology, and Comparative Literature.

Undergraduates proceeding to a degree must participate in one of three 'trunk' courses: Australian Studies; Structure, Thought and Reality; Energy and Life Systems. In addition to a trunk course, students are given the opportunity to explore areas outside their specific interests. Students are not required to settle the selection of their degree programmes until the end of their first year.

Awards. Studies in appropriate programmes will lead to pass or honours degrees in Arts, Education, Psychology, Science, and Veterinary Medicine and Surgery.

The higher degrees offered by the University are the research degrees of Master of Philosophy and Doctor of Philosophy. Course-work masters' degrees are offered in Applied Psychology and Education. A Master of Arts in Literature and Communication is available by external study.

Courses for the degree of bachelor are of the following duration: for the ordinary degree of Bachelor of Arts or Bachelor of Science three years, and for the corresponding honours degree four years; for Bachelor of Education and Bachelor of Psychology four years; and for Bachelor of Education (Honours) and Bachelor of Veterinary Medicine and Surgery five years.

The University also offers three one-year diploma programmes for graduates, one in Mineral Science and two in Education.

External Studies. Special provision has been made for external students, and a substantial and innovative programme of external studies has been developed. External tuition is the responsibility of staff of the schools of study, but the external studies programme as a whole is co-ordinated by a Director of External Studies.

Beginning in 1975 with a small pilot scheme, Murdoch University in 1976 assumed full administrative responsibility for all university external studies in Western Australia. The external studies programmes are equally available to residents in the Perth metropolitan area and to those living outside Perth including interstate and overseas.

Research. In addition to moneys from the University's recurrent budget, finance for research amounting to more than \$1 million was received in 1981 from various government authorities and private organisations. Current research projects include solar energy; the solvation of ions aimed at use in the processing of minerals; solar energy storage batteries; trace element nutrition of the Western Australian sand plain flora; marine biology; reproductive biology; economic and social development projections for the south-west of Western Australia; anxiety in high school students; neurological research; and developmental psychology. The Australian Research Grants Committee provided more than \$165,000 for research in the physical sciences, chemical sciences, biological sciences, veterinary studies and social inquiry during 1982. The National Health and Medical Research Council and the National Energy Research Development and Demonstration Council also provided substantial grants.

The Mineral Chemistry Research Unit at Murdoch University, established in 1974, received further grants from the Government of Western Australia to permit the continuance of research into minerals processing and other fields of chemistry. The University has received substantial funding for solar energy research from both State and Federal sources. The Unit has attracted more than \$100,000 in outside research funds in each of the last three years.

University Government. The governing body of the University is the Senate. It consists of twenty-five members, comprising the Chancellor, the Vice-Chancellor, the Director General of Education or his deputy, the President of the Students' Guild, four members of the academic staff, one member of the non-academic staff, two students elected by the students, six members appointed by the Governor, two persons who are not Members of Parliament nominated by the Premier and the Leader of the Opposition, three persons elected by Convocation, and three co-opted members. Under the Murdoch University Act the Senate has established an Academic Council, its principal functions being 'the discussion and submission to the Senate of opinions and recommendations on academic policy, academic development, the admission of students, instruction, studies and examinations, research, the admission to degrees, the discipline of the University and any other matters which in the opinion of the Academic Council are relevant to the objects of this Act'.

Development of Site. The University site comprises 230 hectares of undulating land south of the Swan River about thirteen kilometres from the Perth city centre and eight kilometres from Fremantle. An area of approximately 175 hectares was formerly part of the Somerville Pine Plantation and was given to Murdoch University by the University of Western Australia.

The major buildings erected during the first triennium were the first stage of the Veterinary School and four main buildings which are grouped around an open court in an elevated position in the northern part of the site. These buildings comprise the Library and Lecture Block, the East Academic Building (physical sciences), the West Academic I Building (humanities), and the Student and Staff Amenities Building. The West Academic II Building (Education, Human Communication, and University Administration), Environmental Sciences, Biological Sciences and the second stage of the Veterinary School (including clinic and hospital) have since been added. Squash courts, senate chambers and bank facilities were completed during 1981. Eight hectares are grassed for playing fields in the south-west part of the site, thirty-two hectares in the south-east are developed as a veterinary farm and holding area, and five hectares are reserved as a native fauna research unit.

EXPENDITURE ON EDUCATION BY STATE AND LOCAL AUTHORITIES

State and local authorities comprise the State government, statutory authorities, boards, commissions and corporations, and incorporated bodies in which the State government or its agencies have a controlling interest (other than financial enterprises) together with municipal governments constituted under local government legislation.

STATE AND LOCAL AUTHORITIES (a): OUTLAY ON EDUCATION (b) (\$'000)

Item	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Transportation of students (c)	8.124	9.701	10.966	11.899	13.909	16.719
Primary and secondary education —						
Current	173.430	210.994	236.734	266.322	302.763	364.275
Capital	33.724	29.983	44.814	40.421	26.624	27.360
University education —						
Current	33.926	42.122	48.191	50.263	55.127	60.333
Capital	5.112	9.834	7.675	5.195	3.016	3.210
Vocational and other higher education —						
Current	76.472	91.679	99.032	107.768	118.525	119.558
Capital	10.782	9.491	9.615	16.286	17.682	14.314
Other education programmes —						
Current	9.116	10.060	8.962	5.675	6.046	4.339
Capital	4.356	1.797	652	407	103	80
Unallocated (including general administration) —						
Current	8.316	6.494	11.316	13.536	15.139	16.528
Capital	144	368	688	890	448	180
Total	363.502	422.523	478.645	518.662	559.382	626.896
Current	309.384	371.050	415.201	455.463	511.509	581.752
Capital	54.118	51.473	63.444	63.199	47.873	45.144

(a) State authorities comprise State Government departments and instrumentalities. Local authorities refer to municipal governments set up under local government legislation. (b) Includes expenditure from Commonwealth Government Grants for education. (c) For current purposes.

Financial Assistance for Schools and Students

The State Government provides financial aid to non-government schools by means of a direct annual grant in respect of each pupil enrolled. The value of the grant is 26 per cent of an amount estimated to be the average cost of educating a pupil in government schools, less the assessed value of goods and services supplied or paid for by the Minister for Education in relation to a pupil. Separate rates apply to primary and secondary schools.

Assistance is given to private schools by way of reimbursement of interest paid, up to a prescribed maximum rate, on moneys borrowed for expenditure on new residential accommodation, classrooms and associated facilities and school site acquisition. The scheme also applies to the provision of teacher accommodation north of the 26th Parallel.

At the beginning of the 1976 school year, the State Government introduced a living-away-from-home allowance, free of means test, to supplement the isolated children's allowance paid by the Commonwealth Government. The allowance of up to \$250 per annum ensures a combined minimum payment of \$1,030 per annum for a child who is obliged to live away from home to attend school.

School Book Assistance is available to indigent parents who have children in Years 8 to 10. This scheme aims to assist parents who are unable to meet the cost of their children's books.

COMMONWEALTH GOVERNMENT ASSISTANCE FOR EDUCATION

Although education is primarily the responsibility of the States, the Commonwealth Government also provides moneys for the financing of educational institutions and the assistance of students.

Finance for Institutions

COMMONWEALTH GOVERNMENT ASSISTANCE FOR EDUCATION WESTERN AUSTRALIA (\$'000)

Nature of assistance	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Assistance of a revenue nature —						
Universities	32,891	40,794	46,532	48,318	53,190	59,443
Colleges of advanced education (a)	36,522	46,242	48,080	49,560	53,290	60,064
Technical education	3,322	3,607	4,521	5,160	4,780	9,032
Schools	23,194	33,520	35,293	38,741	44,019	51,656
School-to-work transition	—	—	—	—	482	2,567
Child migrant education (b)	233	2	41	140	125	367
Aboriginal education	1,979	2,035	2,184	1,996	2,047	2,218
Pre-schools and child care	4,579	5,287	6,247	6,379	6,484	6,976
Educational research	59	70	75	74	111	99
Total	102,779	131,557	142,973	150,368	164,528	192,422
Assistance of a capital nature —						
Universities	5,094	9,822	7,664	5,185	3,006	3,199
Colleges of advanced education (a)	7,344	5,074	5,198	5,863	3,044	2,773
Technical education	2,876	3,690	2,993	3,726	10,481	9,148
Schools	10,565	6,999	16,713	20,971	11,011	14,079
Child migrant education (b)	(c) —9	—	—	—	—	—
Aboriginal education	25	119	61	159	23	21
Pre-schools and child care	1,877	481	197	218	176	245
Total	27,771	26,185	32,826	36,122	27,741	29,465
GRAND TOTAL	130,550	157,742	175,799	186,490	192,269	221,887

(a) Including teachers colleges. (b) From January 1976 administered by the Schools Commission. (c) Amount allocated but subsequently returned.

Grants to the States for education began with contributions towards the recurrent expenditures of universities in 1951-52. Some account of the legislation authorising payment of grants by the Commonwealth Government appears in *Western Australian Year Book*, No. 12 — 1973 (pages 182-4) and earlier issues. In December 1973 the Schools Commission was established by the *Schools Commission Act* 1973 to administer programmes of assistance to primary and secondary schools in the States and Territories. The *Tertiary Education Commission Act* 1977 established the Tertiary Education Commission as a replacement for three former Commissions — the Universities Commission, the Commission on Advanced Education and the Technical and Further Education Commission — to administer the programmes of assistance for tertiary education throughout Australia. Further information on these Commissions and the programmes of assistance can be found in the Budget Paper *Payments to or for the States, the Northern Territory and Local Government Authorities* published by the Commonwealth Government.

An offer by the Commonwealth Government to assume full financial responsibility for tertiary education from 1 January 1974 was accepted by the States at the Premiers' Conference in

June 1973. (At the same time it was agreed that appropriate offsets would be made in the general purpose funds provided by the Commonwealth Government to the States.)

Until December 1973, the Commonwealth Government continued to make grants to the States for universities, colleges of advanced education, teachers colleges and pre-school teachers colleges on the basis of the existing 'matching' arrangements with the States. These arrangements provided for grants for recurrent expenditure to be made by the Commonwealth Government on the basis of \$1 for each \$1.85 of State grants and student fees combined. Grants for capital expenditure were made on a \$1 for \$1 basis with moneys spent by the States for this purpose.

The inclusion of teachers colleges and pre-school teachers colleges in the arrangements for other tertiary institutions resulted from a decision that assistance would be provided to these colleges from 1 July 1973 on the same basis as to universities and colleges of advanced education. Previously, assistance had been granted for teachers colleges and pre-school teachers colleges under the States Grants (Teachers Colleges) Acts of 1967 and 1970 and the *States Grants (Pre-School Teacher Colleges) Act 1968*. Grants under these Acts were provided to the States for constructional work and equipping of teachers colleges and to expand the capacity of pre-school teachers colleges. Grants for teachers colleges under these arrangements ceased on 30 June 1973 and those for pre-school teachers colleges at the end of 1973.

Assistance for Students

As part of the arrangements whereby the Commonwealth Government assumed full financial responsibility for tertiary education, tuition and related fees in universities, colleges of advanced education, teachers colleges and technical colleges were abolished.

Tertiary Education Assistance Scheme. A system of tertiary allowances authorised in terms of the *Student Assistance Act 1973* came into operation at the beginning of 1974. Under this scheme full-time Australian students enrolled in an approved course at a university, college of advanced education, teachers college, technical college or agricultural college and some non-government institutions may apply for a living allowance subject to a means test. Dependants' allowances are also payable. Students who qualify for the payment of a living allowance are entitled to two other types of benefit, an incidentals allowance and a fares allowance.

Aboriginal Study Grants Scheme. The Aboriginal Study Grants Scheme provides assistance on a full-time or part-time basis to Aboriginal students who have left school and are undertaking further education such as business college courses, courses in creative arts and culture, and courses in domestic crafts, as well as more formal tertiary and post-secondary courses. Allowances for dependants, text books and equipment, travel, clothing and other items are also payable. Part-time students receive an allowance to help meet expenses associated with their course and for those students who undertake their courses by correspondence, assistance with travel and accommodation costs at residential schools is also provided. For both full-time and part-time students, all compulsory fees are met.

Aboriginal Overseas Study Awards Scheme. The Aboriginal Overseas Study Awards Scheme was introduced in 1975 to enable leaders or potential leaders of the Aboriginal community who already have considerable experience in their occupational or professional fields to add to their skills and experience by means of short-term programmes of study, observation and discussion overseas. Allowances payable include: travelling allowance, fares allowance, equipment allowance and additional allowances if the award holder's normal income is discontinued.

Postgraduate Awards. Holders of Postgraduate Awards are paid allowances to assist them to study for higher degrees at universities or colleges of advanced education. Dependants' allowances and establishment allowances may also be payable.

Secondary Education. The Secondary Allowances Scheme assists families with limited financial resources to maintain children at school for the final two years of secondary education. Benefits are subject to a means test.

The Adult Secondary Education Assistance Scheme provides benefits comparable to those available under the Tertiary Education Assistance Scheme to adult students undertaking full-time studies in the final year of secondary schooling.

Aboriginal Secondary Grants Scheme. The Aboriginal Secondary Grants Scheme provides financial assistance to encourage Aboriginal children to remain at school for as long as they can benefit from it. The Scheme includes all Aboriginal children attending secondary schools and classes, as well as those attending primary school who are aged fourteen years or over. Benefits include a living allowance or assistance with boarding costs, a contribution towards fees and expenditure on books, uniforms and other school-related expenses, and a personal allowance paid to students.

Migrant Children. The Commonwealth Government provides funds for migrant and multicultural education to government and non-government school authorities in the States under the relevant States Grants (Schools) Acts through the Schools Commission's Programs. Funds may be used for a broad range of activities related to teaching English as a second language, including the payment of salaries to special teachers, advisers and ethnic teacher-aides. In 1980 funds were also made available specifically for a Multicultural Education Program which emphasises the teaching of community languages in schools. A contingency programme has also been established for refugee children to assist their successful transition into established school programmes.

Soldiers' Children Education Scheme. The *Repatriation Act* 1920 provides assistance for the education and training of children of ex-servicemen who have died as a result of war service, or are either totally and permanently incapacitated or blind. The allowances paid cover expenditure on fees, books, equipment, fares and other items.

Assistance for Isolated Children Scheme. This scheme of allowances was introduced to assist in the education of children who, because of their geographic isolation, are without reasonable daily access to a government school providing courses at the appropriate level. Benefits payable in respect of children living away from home to attend school comprise: boarding allowances (partly subject to means test) and, in cases of particular hardship, a special supplementary allowance. For isolated children who study at home by correspondence there is an allowance free of means test. Assistance is also made available where a family, in preference to boarding the children away from home, sets up a second home to enable the children to attend school on a daily basis.

Chapter V—continued

Part 2 — Arts, Science and Recreation

PUBLIC LIBRARIES

The Library Board of Western Australia

The Library Board of Western Australia is constituted under the provisions of the *Library Board of Western Australia Act 1951-1974*. It was set up as an independent statutory authority in 1952.

The Board consists of twelve members. The Director-General of Education is an *ex officio* member. The remaining eleven members are appointed by the Governor, five being nominated by the Minister and the other six selected by the Minister. Of these six members, one represents the Library Association of Australia, Western Australian Branch, and the other five represent local government interests throughout the State.

The Board's main responsibilities are to advise the Minister and local authorities on matters of general policy relating to libraries and to administer the funds made available by Parliament for the State library and information service.

THE LIBRARY BOARD OF WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Expenditure —						
Salaries and wages	\$ 1,423,862	1,672,991	1,967,960	2,296,842	2,765,304	3,126,809
Books, periodicals and binding	\$ 1,181,408	1,630,825	1,791,413	2,104,601	2,356,378	2,165,454
Other	\$ 223,248	287,000	376,406	496,446	(a) 649,208	(a) 854,216
Total	\$ 2,828,518	3,590,816	4,135,779	4,897,889	5,770,890	6,146,479
Number of —						
Full-time staff (b) —						
Qualified librarians	51	57	62	72	78	83
Student librarians and cadets	16	17	15	12	9	8
Other	126	134	139	140	148	144
Total	193	208	216	224	235	235
Associated public libraries (b) —						
Perth Statistical Division	38	39	41	43	47	49
Other statistical divisions	114	120	124	125	137	147
Total	152	159	165	168	184	196
Books —						
Reference and Central Music Library stock —						
Bound volumes (b)	293,450	(c) 302,357	(c) 311,258	323,015	336,398	341,462
Periodical and serial titles received	9,145	9,634	10,288	11,053	(d) 8,307	9,535
Music scores	16,951	17,576	18,508	19,776	21,191	22,765
Circulation library stock —						
Books processed for circulation	159,781	194,212	209,472	204,557	230,932	212,541
Net additions to stock	62,846	95,416	86,714	55,266	98,166	72,771
Stock (b)	1,063,039	1,158,416	1,244,269	1,299,535	1,397,701	1,470,472
Received and dispatched in the exchange programme with local libraries	469,930	502,878	554,156	566,774	608,230	666,498
Inter-library requests received	82,478	85,559	93,452	97,672	101,510	109,839

(a) Includes microfilm and ancillary expenditure previously included with *Books, periodicals and binding*. (b) At 30 June.
(c) Includes government legal deposit publications not previously reported. (d) Decrease is a result of excluding inactive serials.

The State library service comprises: The State Reference Library of Western Australia which includes the Central Music Library; the J. S. Battye Library of West Australian History including the State Archives; the State Bibliographical Centre; the State Film Centre; and local public libraries throughout the State. These units are co-ordinated by the Board to provide an integrated and comprehensive library and information service throughout the State.

The State Reference Library of Western Australia

The origins of the State Reference Library date from 1886 when the Government resolved to establish a library to mark the Golden Jubilee of Queen Victoria. In 1911 this library became the Public Library of Western Australia and is now The State Reference Library of Western Australia.

The State Reference Library differs from other libraries in that its function is not principally to supply books but to provide information in answer to inquiries. It handles over a hundred serious or research inquiries per day, and for this purpose is divided into specialised subject units, each of which has staff experienced in the subject matter concerned.

The *Commerce and Technology Division* provides the business and industrial community, and the tradesman and handyman with the latest technical information and also makes available older material of research value and general works intended for the non-specialist. It comprises the Library of Business, Science and Technology and the Business Information Centre. The Centre provides immediate answers to quick reference questions in the commercial and business field. It has telephone directories, business directories, financial services, newspapers and similar material from many parts of the world.

The *Humanities Division* covers a wide field in the arts and social sciences, and includes comprehensive sets of the official publications of the Commonwealth Government, State Governments, and selected overseas governments. The Division caters for the personal needs of the individual seeking information and for the needs of organisations and other bodies concerned with, for example, social welfare, industrial relations and public administration. Economics, politics, law, statistics, education, sociology, history and geography are some of the major areas well represented in the social sciences collection. In the humanities, the collection of works about art and artists is significant and material dealing with other aspects of the fine arts such as architecture, sculpture, furniture, porcelain and china is also held.

The State Reference Library is equipped with microfilm, microfiche, photocopy and tape-recording apparatus. Photocopies of material are available to the extent permitted by the *Copyright Act 1968* (Commonwealth), on payment of an appropriate fee.

In addition to providing reference facilities in the metropolitan area, the service of the library extends throughout the State, through the agency of local public libraries.

The Central Music Library. This is the principal music library of the State. It offers a full reference service in the field of music, and scores are available on loan.

The J. S. Battye Library of West Australian History

This Library covers all aspects of the history and development of Western Australia. It has a very large collection of historical documents and papers, including the State Archives (see below). It also records and holds oral history tapes and is responsible for the State Film Archives which is a collection of cinematograph film and associated material relating to Western Australia. The library has the latest information on State developments. It receives the Government Gazette of Western Australia on the day of issue, all Royal Commission and similar reports on the day that they are tabled in Parliament, proposed amendments to town planning schemes as soon as they are issued, and all current Western Australian publications received under copyright. Environmental Impact Statements are obtained immediately on release.

The State Archives. Under legislation passed in 1974 the Board has responsibility for the control and custody of all State archives. These include the records not only of the Government but also of all local authorities and all other bodies established under statute. So long as they are in current use they remain the responsibility of the department or body concerned, but when they cease to be in current use they become the responsibility of the Board and their destruction is prohibited without the approval of the Board.

The State Bibliographical Centre

The function of the State Bibliographical Centre is to encourage and facilitate co-operation between all libraries in Western Australia, so that the total resources in the State may be made available to all library users.

The Centre operates the Request and Information Service provided by the Board for all public libraries, organises inter-library loans for, or between, any other approved libraries in the State or elsewhere, and offers bibliographical assistance to any library and to users of the State Reference Library. For these purposes it is equipped with catalogues of the whole stock of the Library Board and with union catalogues of both monographs and journals in over 200 other libraries ranging from those of the University of Western Australia to highly specialised collections held by private concerns or government departments. It also has a large range of published bibliographies from many parts of the world. The Centre is connected by telex to all major libraries of the world.

The State Film Centre

The State Film Centre was transferred from the Education Department to become the responsibility of the Library Board in July 1978. It holds a lending collection of cinematograph film of general interest.

Local Public Libraries

The books in all public libraries in the State are supplied by the Board and remain its property. The Board's policy is to supply books on a minimum basis of 1.25 volumes per head of the population served by the library concerned. At least one-quarter of the books in each library are withdrawn each year and replaced by a corresponding number of fresh volumes.

Any non-fiction book in the State-wide stock is available at any public library if requested by a reader. A printed subject catalogue of the stock is supplied free to every library each year. In the metropolitan area the Board provides a delivery van service to libraries.

Prior to despatch, all books supplied to public libraries are fully catalogued and prepared for use by the Board, which also maintains central stock and location records.

As far as possible, selection of books for each library is carried out by the local librarian but the Board's staff makes the selection for those libraries which are unable to do so.

The Board is not responsible for the provision of local premises nor the employment of local staff, which are provided by the local authority concerned. However, professional advice on library design is available to architects and local authorities.

All 139 local authorities in Western Australia have established one or more public libraries.

THE WESTERN AUSTRALIAN MUSEUM

The Western Australian Museum developed from two earlier collections. One of these, the museum of the Swan River Mechanics' Institute, was founded by public subscription in 1860, and the other, the Geological Museum at Fremantle, was started in 1881. In 1889 the contents of the Geological Museum were moved to the former Perth Gaol and a Curator was appointed in 1891. In the following year the museum of the Swan River Mechanics' Institute was purchased, and the collections combined to form the Public Museum which, in 1897, became known as the Western Australian Museum. The former Perth Gaol is still part of the Western Australian Museum; it has been renovated, and was re-opened to the public for display purposes in December 1976.

Under the provisions of the *Museum Act 1969-1973*, The Western Australian Museum is governed by seven Trustees appointed by the Governor. The staff is grouped functionally within Divisions of Human Studies, Natural Science and Professional Services, and an administrative unit.

The headquarters of The Western Australian Museum and its principal display galleries are situated in Perth. Branches have been established at Fremantle in 1970 (Fremantle Museum and Western Australian Maritime Museum), Albany in 1975 (Albany Residency Museum) and in Geraldton in 1980 (Geraldton Museum). The branches are governed by Committees of Management appointed by the Trustees. The Fremantle and Geraldton Branches contain maritime and historical displays, and the Albany Branch has displays relating to the environment, exploration and early settlement of the region.

The work of the Museum is concerned mainly with natural sciences and human studies. Emphasis in both display and research is on the fauna and the human population, past and present, of Western Australia. Research within the Division of Natural Science is related specifically to marine fauna, mammals, birds, reptiles, insects and fossils of the State. The Division of Human Studies is concerned with Aboriginal archaeology and rock art, prehistoric archaeology, Aboriginal material culture, social history, maritime history, underwater archaeology, industrial and agrarian technology, and arms and armour. The Division of Professional Services co-ordinates the work of departments responsible for display, material restoration and conservation, children's educational services, publications, assistance to municipal museums and the research library.

The Trustees are empowered to assist in establishing and maintaining municipal museums. The Museum's role is mainly to assist by making available the expertise of its own staff in advising on the maintenance of collections, restoration of objects and on museum design, and by depositing objects for display in recognised museums.

THE WESTERN AUSTRALIAN MUSEUM (a) (b)

Particulars		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Expenditure —							
Salaries and wages	\$	1,232,034	1,565,150	1,814,443	2,052,178	2,380,526	2,756,085
Other	\$	710,524	741,398	1,050,101	921,637	1,082,146	1,154,594
Total	\$	1,942,558	2,306,548	2,864,544	2,973,815	3,462,672	3,910,679
Square metres of —							
Display area (c)		3,290	3,830	3,830	3,642	4,590	4,797
Storage area (c)		3,527	3,527	3,527	3,381	3,381	3,472
Total		6,817	7,357	7,357	7,023	7,971	8,269
Number of —							
Staff (c)							
Professional		48	49	50	49	57	59
Technical		48	51	48	53	51	48
Administrative and clerical		26	28	28	30	30	33
Attendant-receptionist		34	36	36	36	47	49
Total		156	164	162	168	185	189
Man-days spent on field work		2,456	4,268	4,298	4,143	4,513	5,873
Visits by school parties		1,917	1,836	1,668	1,775	1,750	1,580
Children attending in school parties		65,128	52,407	49,908	52,573	45,714	47,217
Children attending vacation activities		10,326	9,543	8,683	11,575	10,512	10,201
Total visitor's attendances (d)		234,861	289,850	335,496	(e) 351,236	(f) 379,203	349,296

(a) Including branches at Albany and Fremantle. (b) From 1980-81 includes Geraldton Branch, opened December 1980. (c) At 30 June. (d) Including attendances of school children. (e) Including attendance of 23,792 at Museum's Travelling Exhibition. (f) Including attendance of 18,403 at Museum's Travelling Exhibition.

The Museum is an active educational instrument. Members of the scientific staff lecture in the various departments of tertiary educational organisations. Educational Centres, staffed by teachers provided by the Education Department, conduct classes at the Museum in Perth and the Fremantle Branch throughout the year. Regular classes for primary schools are held during school term and special visits are arranged for secondary schools at both Perth and Fremantle. In addition special visits at both museums, as well as at Albany and Geraldton, are

made by children from schools not included in the regular series. During school holidays quizzes are available at the Education Centres at Perth, Fremantle, Albany and Geraldton.

The Museum is often called upon to act in an advisory capacity to government departments. Senior staff serve on Government committees for protection of the heritage, the environment and wildlife. The Museum is assisted in certain fields by Honorary Associates, some of whom serve on advisory committees appointed by the Trustees.

Under the *Aboriginal Heritage Act 1972-1980* the Trustees act as an advisory body to the Minister. The Act provides for the Registrar of Aboriginal Sites, the principal executive officer of the Aboriginal Cultural Material Committee, to be a member of the Museum staff. The Committee advises the Trustees on all matters concerning the administration of the Aboriginal Heritage Act. The Aboriginal Sites Department within the Museum carries out the programme of site recording and protection.

In March 1977, the High Court invalidated the provisions of the *Maritime Archaeology Act 1973* dealing with maritime archaeology material lying in waters adjacent to the coast of Western Australia, or derived from such sources, and the Commonwealth *Historic Shipwrecks Act 1976* came into operation. Under the Commonwealth Act the Museum has continued its maritime archaeology programme and undertaken inspection and control of wrecks scheduled in the Act; certain powers under the Act are delegated to the Museum's Director by the Minister.

Under the provisions of the *Museum Act 1969-1973* all meteorites are declared to be the property of the Crown and are vested in the Museum.

THE ART GALLERY OF WESTERN AUSTRALIA

The Art Gallery of Western Australia is under the control of a Board of seven members appointed by the Governor under the provisions of the *Art Gallery Act 1959-1981*.

A new art gallery building, representing the first stage of the Perth Cultural Centre, was opened on 2 October 1979. The building is designed on an hexagonal form to allow maximum use of space and flexibility of display. It incorporates seven major galleries, including a specialist ethnic gallery, an auditorium, conservation laboratories, a prints and drawings study room, a restaurant, a bookshop and a reading room. Storage areas, mechanical and electrical plant, packing rooms and a workshop are located in the basement area. The building is fully airconditioned and humidified.

The gallery Administration Centre, linked to the art gallery via a walkway, incorporates a library, a theatrette and the Art Gallery Society rooms.

A service is provided to country areas. Education officers take on tour exhibitions of art works from the Art Gallery collection. Selected art works are circulated to metropolitan primary and secondary schools and to tertiary institutions.

The Art Gallery operates a general information service; publications on the collection are available and tours conducted by volunteer gallery guides are arranged. Films are screened regularly in the theatrette and a series of musical recitals by local artists are held in the auditorium. Both are open to the public and are free.

Exhibitions and activities for children, which are supervised by the Galleries' education officers are held during school time and over the holidays.

The Director and professional staff are often called upon to judge exhibitions, present lectures and sit on various planning and advisory committees.

The Gallery is constantly making acquisitions for its permanent collection, and the Great Australian Paintings Appeal in 1978-79 enabled the Gallery to expand its collection with a number of excellent works of important Australian artists. Gifts of art works and donations by the Art Gallery Society and individuals also enhance the Gallery's collection.

THE ART GALLERY OF WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Expenditure —						
Salaries and wages	\$ 277,477	373,200	389,606	448,961	708,373	798,610
Acquisition of exhibits	\$ 95,753	217,766	467,206	281,521	608,002	614,118
Exhibitions, lectures and films	\$ 23,781	47,419	56,367	117,539	94,039	62,992
Loan redemption and building costs	\$ 555,934	194,678	2,036,561	1,155,628	662,161	962,898
Other expenses	\$ 107,106	139,035	216,977	227,257	709,386	723,550
Total	\$ 1,060,051	972,098	3,166,717	2,230,906	2,781,961	3,162,168
Number of —						
Staff —						
Full-time —						
Professional	11	9	12	12	17	18
Administrative and clerical	6	9	12	10	13	14
Attendants and other support staff	17	20	19	19	31	31
Honorary	2	2	1	—	—	—
Part-time	—	—	—	1	5	5
Total	36	40	44	42	66	68
Exhibits for display (a) —						
Paintings — Oil and other media	602	617	682	704	721	735
Watercolour paintings	236	248	429	442	453	459
Engravings, prints and woodcuts	2,207	2,291	3,153	3,230	3,294	3,432
Sculpture	80	83	101	102	116	132
Craft items	1,264	1,271	1,356	1,478	1,548	1,642
Photography	—	—	—	—	16	20
Tribal art	496	499	499	499	499	499
Total	4,885	5,009	6,220	6,455	6,647	6,919
Exhibitions for year	9	7	10	18	29	45
Visitors' attendances	118,704	100,670	111,661	73,728	211,521	228,553

(a) At 30 June.

THE WESTERN AUSTRALIAN ARTS COUNCIL

The Western Australian Arts Council was established by the *Western Australian Arts Council Act 1973*, operative from 1 December 1973. The Council took over the functions of the Western Australian Arts Advisory Board. In terms of the Act, 'it shall be the general duty of the Council to encourage, foster, and promote the practice and appreciation of the arts in Western Australia'. The Council may make grants, pay subsidies or furnish advances to local authorities, organisations or persons engaged in activities consistent with this duty. Subject to the provisions of the Act, the Council may 'generally do whatever it considers necessary or expedient in order to stimulate artistic or cultural activity'.

The Council is charged with three specific functions: to enhance the standards of performance and execution in all aspects of the arts; to make accessible to the public of Western Australia all forms of artistic and cultural work; and to foster and maintain public interest in the arts and culture of the State.

The Council undertakes these functions through the funding of arts organisations and events which could not operate or take place without financial support; through a statewide touring programme which includes performances, exhibitions and tutors; and through a development and advisory service which encourages self-help whilst providing assistance from a central source.

Funds available to the Council to enable it to exercise its functions include amounts appropriated by the State Parliament or made available by the Commonwealth Government, amounts borrowed by the Council under the provisions of the Act, and moneys which may be advanced by the Treasurer.

The Council is affiliated with the Arts Council of Australia and through its touring activities acts as the Western Australian Division of that body.

STATE GOVERNMENT OBSERVATORY

The Perth Observatory was originally established, near Kings Park, in 1896; the present buildings, near Bickley in the Darling Range, were officially opened on 30 September 1966.

The astronomical instruments at the Observatory are a photographic refractor of thirty-three centimetres aperture combined with a guiding telescope of twenty-five centimetres aperture, the Hamburg Observatory's nineteen-centimetre meridian transit telescope, the Lowell sixty-centimetre reflector, a forty-centimetre reflector constructed by the Physics Department of the University of Western Australia and a Celestron thirty-six centimetre Schmidt Cassegrain reflector.

The photographic refractor is used for investigations of stellar motions based on measurements of old (1900-1920) and recent photographs; for the recovery of minor planets which have been unobserved for several years; for positional observations of comets, which are used in investigations of comet orbits; and for securing photographs, to a faint magnitude limit, of significant areas of the southern sky, which may be used in the future in determinations of stellar motions.

From late in 1967 to the end of 1971, a team of astronomers from the Hamburg (West Germany) Observatory carried out a programme of observations of the positions of reference stars in the southern hemisphere. Their automated meridian transit telescope is now on indefinite loan to the Perth Observatory. From the end of 1972 to the middle of 1976, a Perth team using the Hamburg equipment carried out sixty thousand observations within the frame of an international programme to improve and extend the fundamental catalogue of star positions. From August 1976 until August 1980 work with the Hamburg equipment was continued on a programme with the emphasis on observing supporting stars in the southern hemisphere. These observations will be used to determine a reference frame of faint stars by means of which the positions of galaxies can be determined. In this way it will be possible to relate the present fundamental system of star positions to an extragalactic reference frame. From August 1980 a new observing programme has been carried out, comprising FK4 stars, certain and suspected radio stars, suspected population II stars, all stars brighter than mag 7.0 between declination $+ 37.5$ and the South Celestial Pole, pulsating variables, reference stars to radio stars and stars of astrophysical interest; a total of 14,702 stars.

The sixty-centimetre reflecting telescope was installed at the beginning of April 1971. It was originally used for observation in the International Planetary Patrol Program, which was financed by the National Aeronautics and Space Administration of the United States of America and conducted by the Lowell Observatory, of Flagstaff, Arizona, U.S.A. This programme involved the photography of the planets Mars, Jupiter, Saturn and, occasionally, Venus. Several different observatories, well distributed in longitude, participated using identical cameras and optical systems. Each planet was photographed systematically through four standard colour filters throughout the period during which it was available. The purpose of this programme was to set up an extensive library of photographs for the study of temporal variations in the atmospheres and surface features of these planets.

The telescope is also equipped with a photo-electric photometer to measure brightness of celestial objects and was used in 1973 to record a series of mutual occultations and eclipses between the four major satellites of Jupiter. This photometer has also been used for investigations of the variations in brightness of stars, planets, satellites and asteroids.

The forty-centimetre University telescope is intended for joint use with researchers from the University of Western Australia mainly for direct photography in the Newtonian and Cassegrain focus, but also for photometry and spectroscopy in the Cassegrain mode. Additionally, this instrument was equipped in 1977 with a two-channel fast photometer to be utilised for accurate timing of star occultations by the moon, and other events requiring high time resolution. The

thirty-six centimetre Celestron telescope is equipped with a solid state photodiode UBVR photometer and is employed generally for photometry and occultation of stars by minor planets.

The computer facilities of the Perth Observatory have improved greatly in recent years. The acquisition of data from the five telescopes via recorders or direct on line is now possible. Video cameras are also employed to search and blink the photographic plates as well as to record the information on video tape.

The policy of the Perth Observatory is strongly directed towards providing collaboration in the area of astrometric research with other observatories and research groups. It maintains the time service for the State, and provides an astronomical information service for educational and general interest inquiries. It is open to visitors daily, except Saturdays, at 3 p.m.

STATE GOVERNMENT CHEMICAL LABORATORIES

In 1922 the various chemical services of the State Government were amalgamated to form the Government Chemical Laboratories, primarily for the performance of chemical work required by government departments. In addition, the Laboratories serve government instrumentalities and semi-government authorities and undertake some chemical work for the general public. The activities of the Laboratories are organised under seven Divisions, the separate functions of which are described briefly in the following summary.

The *Agricultural Chemistry Division* provides chemical expertise to government departments, farmers, industry and private individuals relating to the chemistry of plants, soils, feeding stuffs and fertilisers and its application to agricultural research, including plant nutrition, crop and pasture production, soil fertility, efficient use of fertilisers, animal nutrition, animal health and meat production. Other activities include studies of effects of environmental pollution, regulatory work on fertilisers and oilseed quality, physical characteristics of materials used for dam construction and use of a computer for automatic chemical analysis.

The *Engineering Chemistry Division* is concerned mainly with research and development aspects of the utilisation of the State's mineral resources with some attention to solid fuels. Specific technological problems are investigated at the Division's own initiative or at the request of government departments, companies or individuals. Facilities are available for small and large scale testwork on ore dressing, mineral processing, metallurgical techniques and some aspects of fuel utilisation. Technical advice on these topics is provided as a consultative service. The *Kalgoorlie Metallurgical Laboratory* functions as a section of the Division in providing a regional service to government, the mining industry and prospectors; services include metallurgical investigations, analyses of ores and minerals, and advisory services. The laboratory specialises in ore dressing techniques and all aspects of gold metallurgy.

The *Food and Industrial Hygiene Division* is primarily concerned with food quality, working environments and pesticide residues. Foods are examined with respect to their nutritional value, adulteration, possible contamination, compliance with the appropriate regulatory Acts and suitability for human consumption. In the field of industrial hygiene the Division conducts monitoring programmes and inspections of industrial working conditions with respect to levels of toxic gases, liquids, metals and hazardous chemicals. Recommendations are made to eliminate, or reduce to acceptable levels, potential health hazards in the work place. Biological specimens are examined to determine possible exposure to toxic substances. Pesticide residues are determined in foods, water supplies, crops and stock in order to assess their compliance with prescribed legislation and acceptability for human consumption. Samples of water, marine life and wildlife are analysed to determine and monitor the impact of pesticides and other pollutants on the environment. The Division also examines changing industrial activities with a view to their possible consequences on human health and on the environment.

The *Forensic Chemistry Division* undertakes the forensic chemical investigations in this State and provides scientific support services for the criminal investigations of and law enforcement by

Police. Its activities include toxicological examinations relating to deaths involving drugs or poisons, identification and analysis of illicit drugs, scientific examination of exhibits from scenes of crime to assist in criminal investigations, analysis of blood samples for alcohol in connection with drink-driving offences and fatal traffic accidents. The Division also provides an advisory and analytical service to the racing, trotting and greyhound organisations in connection with doping control.

The *Industrial Chemistry Division* provides technical information and advice on industrial and chemical products for all government departments and instrumentalities, industry and the general public. Areas of particular interest are building materials including all kinds of floor coverings, plastics, paints and chemical specialities, such as detergents, polishes, adhesives and textiles. Facilities are provided for the testing of these materials. Other chemical processing is included with the exception of minerals and fuels, with the provision of advice on the potential for new chemical manufacturing operations and improvements in existing processes. Related experimental investigations up to pilot plant scale can be undertaken.

The *Mineral Division* is basically concerned with studying and recording the mineralogy of the State. This is done by physical and chemical examination of rocks and mineral specimens obtained from departmental and other sources and by the maintenance of a reference collection of minerals from most known occurrences within Western Australia. A professional service in inorganic chemistry and mineralogy is maintained for government authorities (particularly other branches of the Department of Mines). This service includes areas of environmental and occupational health and building materials. In some circumstances this service is extended to the mining industry, prospectors and the general public.

The *Water Division* analyses waters from all parts of the State for government departments and other authorities and also for the public and makes recommendations on their suitability for specific purposes. It also makes recommendations for treatment to convert an otherwise unsuitable supply to one that is satisfactory for the intended use; these uses include drinking, domestic, irrigation, stock, cooling, heating, industrial, swimming pool and other recreational. The Division analyses effluents and trade wastes and makes recommendations for their treatment so that the environmental impact at their disposal site is minimal. It investigates problems associated with water-formed deposits and corrosion of materials in aqueous environments under both ambient and heated conditions. It regularly surveys bodies of water to determine their condition and to assess levels of any undesirable inputs. These include the estuarine systems of Swan, Peel and Leschenault in the South-West, and other environmental studies.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

Under management arrangements introduced in December 1978, research conducted by the Commonwealth Scientific and Industrial Research Organization (CSIRO) is carried out within five Institutes: Biological Resources, Energy and Earth Resources, Animal and Food Sciences, Industrial Technology and Physical Sciences. Each Institute consists of several Divisions. Of these Divisions, two, Land Resources Management and Mineralogy, have their headquarters in Perth, while several other Divisions utilise laboratories or field stations in Perth and in other parts of Western Australia.

Institute of Biological Resources

Division of Land Resources Management. The Division of Land Resources Management is doing research into the better management of Australia's land and water resources. The aim is efficient productivity consistent with conservation of these resources. The work includes environmental and societal implications of resource management in pastoral, agricultural, forestry and near-urban areas, and the development of methods for processing, appraising and communicating information to assist land-use decision making.

The Division has a national responsibility and research programmes are dealing with a number of resource management situations throughout Australia. In addition to its headquarters at Floreat Park, Perth, the Division also has laboratories in Alice Springs (N.T.) and Deniliquin (N.S.W.).

Land-use and related stream salinity is one of the Division's main concerns. Land development across southern Australia has increased the salinity of surface soil and water resources. For example, widespread removal of native vegetation in south-western Australia has resulted in salt (which has accumulated over thousands of years deep in the soil profile) being discharged into streams and groundwater. Some major rivers, and a good deal of agricultural land, are consequently in poor condition. Research is primarily concerned with the effects of clearing new land and the manipulation of existing cleared land to reduce salt discharge.

The Division's research into rural lands includes the conservation of soil fertility, integrating farming and forestry in managing landscapes, interactions between farming and wildlife, and minimising labour inputs into sheep production systems.

Australia's rangelands (the arid and semi-arid grazing lands) constitute a large area of low rainfall and include major parts of five mainland States. Some vegetation types are badly degraded, others less so. Low or unpredictable rainfall is the overriding restriction, and maintenance or restoration of stability and productivity of the vegetation is the principal objective of the Division's work. Extensive grazing is the most likely continuing use of the rangelands. Other alternatives for particular areas include use by Aborigines, the establishment of national parks, tourism and mining.

Forested lands, which surround many of Australia's major cities, supply not only timber but also vital domestic and industrial water supplies, recreational opportunities and animal habitats. The Division is investigating the management of forested lands in relation to the multiple demands made on them and some of the hazards they are subject to, such as jarrah dieback disease.

The application of remote sensing is an important aspect of the Division's work. Throughout the world, remote sensing techniques are being applied increasingly in resource inventory, and in monitoring the effects of resource use. This programme aims to develop manual and computer techniques for analysing and integrating satellite imagery, aerial photography and ground survey results for specific application to resource inventory and monitoring. It is also actively promoting and assisting the application of remote sensing techniques by industry and management agencies.

Division of Entomology. A research group is studying the role of native and introduced dung beetles in burying accumulations of cattle dung and in reducing the abundance of the dung breeding bushfly in the south-west of Australia. Studies on the ecology of the bushfly will provide an estimate of the effectiveness of beetles and associated predatory mites introduced from overseas in reducing numbers of flies, as new beetles become established in different areas and their populations build up.

Jarrah, an important forest tree in Western Australia, is attacked by the larva of a small moth, Jarrah Leaf Miner. Long-term ecological studies of factors affecting the abundance of the pest and that of its natural enemies have shown that outbreaks of the Leaf Miner are most likely to occur in situations where part clearing, thinning and burning have made the forests more attractive to the moths. The findings are consistent with the historical records showing that outbreaks first occurred in the coastal jarrah affected by settlement in the early 1900s and spread to the inland forest between Mount Barker and Manjimup in the 1950s. The effect of the current forest management on the outbreaks is being evaluated.

The Division is also studying a number of pests of crops, pastures, orchards and livestock, and the biological control of weeds, in collaboration with the Western Australian Department of Agriculture.

Division of Tropical Crops and Pastures. The Division of Tropical Crops and Pastures is responsible for the operation of the Kimberley Research Station which is situated near Kununurra on the banks of the Ord River in the far north of Western Australia.

The principal objectives of the Station's research are to define the factors and to understand the processes involved in efficient crop and pasture production in the Ord Irrigation Area and in similar environments in northern Australia. High-yielding varieties of grain sorghum are being bred and lines with special characteristics, such as disease resistance, are being identified for distribution to sorghum plant breeders; studies are being undertaken with rice to establish the value of various leguminous crops grown in rotation as sources of nitrogen; a research programme to identify soybean genotypes with characteristics for either wet or dry season production in the low latitude tropics is underway, and agronomic and physiological studies designed to understand the limits to crop yield imposed by the tropical environment and by the cultural practices in use in the area are being conducted.

Division of Forest Research. This Division is represented in the State by a Regional Station located at Kelmscott, with a staff of eleven members. Since its inception at Dwellingup in 1949 the station work has centred on jarrah dieback disease, its ecology, rate of spread and soil microbial relationships, and the susceptibility of native and introduced species to infection and the extent of damage caused to them.

Division of Wildlife Research. The Division of Wildlife Research has a group at Helena Valley working on the higher vertebrates (more particularly mammals) and native fauna generally.

Studies of the behaviour and ecology of several species of cockatoos are proceeding. The ecology and behaviour of the Emu and the Noisy Scrub Bird have been the subject of recent studies.

Institute of Energy and Earth Resources

Division of Mineralogy. The Division of Mineralogy is concerned with research bearing on the discovery and definition of Australian mineral resources. Its work deals mainly with the chemical and physical nature of geological processes of mineral formation and alteration.

Under two main programmes, mineralisation and exploration, studies are in progress on processes of ore genesis, particularly with respect to base metal ores, on supergene alteration of these ores, on the geochemical and petrological evidence for defining areas of differing crustal development in the Archaean of Western Australia, and on improving techniques and interpretation of surface geochemical exploration in deeply-weathered arid terrain.

Institute of Animal and Food Sciences

Division of Fisheries Research. The Division of Fisheries Research is studying the biology of the Western Rock Lobster, the basis of Western Australia's most valuable fishery. In support of this programme, the ecology of the coastal limestone reefs and associated waters of the south-east part of the State is being studied.

The Division is undertaking a major study of the fishery potential of the North-West Shelf. It includes research into the biology of the fishes; the identification and study of the organisms of the supporting food chains, and the investigation of the water movements in the area. Many of the management strategies developed for single-species fisheries do not apply in this tropical, multi-species situation. The Division aims to explore the full potential of the North-West Shelf fishery and to formulate new strategies for managing it efficiently.

Division of Animal Production. The Division of Animal Production has established a unit in Western Australia. The research covers a wide range of activities aimed at understanding the nutritional and physiological limitations of wool and meat production and at providing new and improved techniques relevant to livestock production. The greater part of the work is in mineral nutrition; emphasis is now upon the diagnosis and correction of sub-optimal trace

mineral deficiencies and their interaction with other dietary nutrients. Research in livestock reproduction is principally concerned with investigating the reproductive losses in sheep with particular reference to the problem of clover infertility. The unit also serves to provide a link between the livestock industry and the Division's research workers throughout Australia.

Division of Food Research. The Meat Research Laboratory of the Division of Food Research has an extension officer located in the laboratories of the Western Australian Department of Agriculture at South Perth. He is a member of the Meat Laboratory's Industry Section which is responsible for service, investigation, liaison and extension work in meatworks and meat processing establishments, to ensure that the results of investigations by the Commonwealth Scientific and Industrial Research Organization are made known and to encourage their application by the meat industry. The extension officer services processing plants in Western Australia and the Northern Territory and gives a limited extension liaison service to other food processing industries.

Institute of Industrial Technology

Division of Chemical Technology. The Melbourne-based Division of Chemical Technology was responsible for the invention and development of several water purification processes which utilise magnetic reagents. At the Metropolitan Water Authority's treatment works at Mirrabooka a Sirofloc demonstration plant, commissioned early in 1981, has been producing water of acceptable quality. The demonstration plant is designed to produce 35 megalitres per day, and follows successful pilot plant studies on the site by the Division, the Australian Mineral Development Laboratories, and the Metropolitan Water Authority. The process produces purified water from turbid bore water which contains contaminants such as hydrogen sulphide and organically-bound iron. A Sirotherm demonstration plant capable of desalting 1 megalitre per day of brackish bore water was installed at Leederville in 1982. A third water treatment demonstration plant is to be located in the Pilbara, where a magnetic dealkalization process will be utilised to remove hardness and alkalinity from bore water. The demonstration of the three CSIRO inventions follows from the invitation by the Commonwealth Department of Science and Technology for private industry, through the Australian Industrial Research and Development Incentives Board, to assist Government in the development of the new treatment methods.

An officer of the Division is now stationed in the premises of the Division of Land Resources Management at Floreat Park and he is engaged on investigations relating to the development of the woodchip export industry and a possible pulping industry in Western Australia.

Division of Building Research. The Division of Building Research has extensive collaboration with the building, construction and timber industries of Western Australia in many areas including insulation and energy conservation, weathering of materials, the use of waste products, milling and seasoning of timber, preservation of rail sleepers, and computer systems for the organisation of building programmes.

The Division has a major continuing interest in the problems of living in remote communities and is working in a number of mining towns in the tropical region of the State. The research is aimed at demonstrating ways in which conditions can be created that will attract people to settle and stay in these towns.

Institute of Physical Sciences

Division of Oceanography. Research on south-west Australian coastal physical oceanography is undertaken from the Division of Fisheries Research Laboratory at Marmion. This involves a study of the circulation and hydrology of the inner continental shelf waters between Cape Leeuwin and Shark Bay.

A model of the Leeuwin current has been developed, and some oceanographic work is being carried out in conjunction with the North-West Shelf fisheries research programme by staff from the CSIRO Marine Laboratories at Cronulla, N.S.W.

Division of Mathematics and Statistics. The Division of Mathematics and Statistics is concerned with the mathematical analysis of scientific problems and the application of statistical methods to areas of interest in the applied and biological sciences. Its officers also act in an advisory capacity to other research workers in the State on matters relating to mathematical methods, as well as the design of experiments and the analysis and interpretation of statistical data.

Division of Computing Research. The Division of Computing Research, trading as CSIRONET, conducts research and development on various aspects of computing and furnishes a computing service to CSIRO, some government departments, universities and some industrial firms. There are several central host computers in Canberra and Melbourne supplying a variety of computing services. Access is via an Australia-wide network of nodal mini-computers to which are connected various types of peripheral equipment including terminals for interactive computing. Dial-in facilities are also available. The CSIRONET network design allows connection of host machines belonging to other organisations; at present the networks of the Universities of Queensland, Sydney and Tasmania, the Western Australian Regional Computing Centre and the James Cook University are connected; there is also a connection to MIDAS (Multi-mode International Data Acquisition Service) which allows access to networks and host computers in the USA. There is a node computer in Perth through which Perth users may access all CSIRONET facilities.

Division of Cloud Physics. The Division of Cloud Physics is involved, in an advisory capacity, with a State Government-supported project, initiated by the W.A. Weather Research Association, a private farmers' group, to study the prospects for rainmaking in the northern wheatbelt.

DEPARTMENT OF AGRICULTURE

Reference to the scientific work of the Department of Agriculture appears in the section *The Department of Agriculture* in Chapter VIII, and also in Chapter VII, Parts 1 and 2.

BOTANIC GARDEN

The Botanic Garden was established in Kings Park in 1962 and is under the control of the Kings Park Board (see following section *Public Parks and Reserves*). The Botanic Garden is the counterpart of The Western Australian Museum in the botanical field and complements the State Herbarium by maintaining collections of living plants for scientific and educational purposes. Its official objects are to foster public interest in the conservation and cultivation of the Western Australian flora; to contribute to public education in this field; to become a centre for botanical and horticultural research in the flora of Western Australia; and to provide a major tourist attraction. The education centre established in the Park caters for more than ten thousand school children each year.

The Garden, which was officially opened in October 1965, extends over thirty-four hectares, made up of the Western Australian collection (seventeen hectares), Californian, South African and Mediterranean collections (three hectares), and an arboretum of native trees (fourteen hectares). The indigenous flora of the State is represented in the Western Australian collection by approximately 1,200 species. Trees grown as specimens in the arboretum are mainly those which are native to the southern half of the State.

Parties from the Botanic Garden are regularly in the field for the collection of propagating material. Special attention is devoted to the preservation of rare species or species threatened with extinction. Seed of native plants collected is distributed from surplus stocks to botanical institutions throughout the world. A seed list, which normally offers from 1,000 to 1,300 species, is published annually, and more than 10,000 packets of seed are distributed each year.

Experimental work in propagation of native plants is carried out and a native plant display is held in the Park each spring. Lectures are given by members of the staff to interested societies

and to students engaged in related courses of study. The public may also, by arrangement, consult the Horticultural Adviser particularly for advice on the cultivation of native plants. Facilities are provided for the employment and training of students enrolled in the three-year course for the Certificate in Horticulture, which is conducted by the Technical Education Division of the Education Department.

PUBLIC PARKS AND RESERVES

It is within the power of the Governor to dispose of, in any manner which serves the public interest, lands which are vested in the Crown and, in terms of this authority, Crown land is frequently reserved by order of the Governor for a variety of public purposes. Some of this land is reserved for public recreation and amusement, national and other public parks, or flora and fauna sanctuaries and the reserves are controlled by statutory bodies, the more important of which are dealt with in this section.

NATIONAL PARKS AUTHORITY OF WESTERN AUSTRALIA PARKS AND RESERVES VESTED IN THE AUTHORITY 4 SEPTEMBER 1981

National Park or Reserve	Area	National Park or Reserve	Area
	hectares		hectares
Alexander Morrison	8,501	Lesmurdie Falls	56
Araluen-Canning Dam Reserve	20	Matilda Bay Reserve	25
Avon Valley	4,377	Millstream	441
Badgingarra	13,121	Moore River	17,543
Boorabbin	26,000	Nambung	17,491
Cape Arid	279,415	Nowergup Lake	117
Cape Le Grand	31,390	Neerabup	1,078
Cape Range	50,581	Peak Charles	39,959
Charles Gardner Flora Reserve	792	Pemberton	3,263
Chichester Range	150,609	Penguin Island Reserve	13
Collier Range	277,841	Porongurup	2,401
D'Entrecasteaux	36,599	Porongurup Range Reserve	61
Drovers Cave	2,681	Rudall River	1,569,459
Drysdale River	435,591	Scott	3,273
East Perth Cemetery Reserve	5	Serpentine	635
Eucia	3,342	Sir James Mitchell	1,087
Fitzgerald River	242,739	Stirling Range	115,671
Frank Hann	49,877	Stockyard Gully	1,406
Geikie Gorge	3,136	Stokes	9,493
Geekabee Hill Flora Reserve	4	Tathra	4,323
Goongarrie	49,878	Torndirrup	3,868
Gooseberry Hill	33	Tunnel Creek	91
Greenmount	56	Walpole-Nornalup	18,116
Haddleton Flora Reserve	1,325	Walyunga	1,790
Hamersley Range	617,606	Watheroo	44,324
Hassell	1,281	William Bay	1,902
John Forrest	1,578	Windjana Gorge	2,134
Kalamunda	375	Wolf Creek Crater	1,460
Kalbarri	186,076	Yalgorup	11,545
Keane's Point	2	Yanchep	2,799
Leeuwin — Naturaliste (a)	13,239	Yanchep Flora Reserve	113
Total area of National Parks and Reserves			4,364,007

(a) Portion of unsurveyed coast not included.

The *National Parks Authority Act 1976*, which came into operation on 1 August 1976 provides for the vesting and management of certain areas as National Parks or Reserves, for the conservation of the natural environment, the preservation and enhancement of natural beauty, and the provision of access and facilities for public recreation. The Act constitutes a National Parks Authority of Western Australia of nine members and provides for the appointment of a Director of National Parks. Under the legislation, areas of the State formerly controlled by the National Parks Board, established under the *Parks and Reserves Act 1895-1978*, became the responsibility of the National Parks Authority.

Members of the National Parks Authority of Western Australia, appointed by the Governor, comprise a President, nominated by the Minister; the holders (or their nominees) of

the offices of the Conservator of Forests, the Director of Fisheries and Wildlife, the Director of the Department of Tourism and the Surveyor General; and four persons nominated by the Minister to represent the interests of the public with respect to primary industry, local government matters and conservation or community service matters relevant to the concept of National Parks.

The *National Parks Authority of Western Australia* controlled fifty National Parks and a number of other reserves at 4 September 1981, totalling in all about 4.4 million hectares in area. Flora and fauna are protected and firearms prohibited in all National Parks and Reserves controlled by the Authority. Picnic, recreational, camping and caravan facilities are available in certain parks and reserves.

The *King's Park Board* administers an area of almost 401 hectares close to the centre of Perth. Part of this area was dedicated in 1872 'for the purpose of a public park and recreation ground' and was enlarged in 1890. Beautification commenced in 1896 under the presidency of Sir John Forrest, and the name was changed in 1901 from Perth Park to The King's Park in honour of the accession of King Edward VII. In addition to its original function as park and recreation ground, The King's Park (now referred to as Kings Park) has over the years gradually developed two other important functions, as a National Shrine and as a Botanical Reserve. In the former case it houses the State's most important monuments and commemorative features of a military and historical nature. A memorial to the South African war was built in 1901, and the State War Memorial to the fallen of both world wars was erected on a commanding position on Mount Eliza in 1929 and extended in 1952. 'Honour Avenues' of trees dedicated to individual fallen servicemen were planted in 1919 and later, and another avenue commemorates the State Centenary of 1929. There are smaller memorials erected by individual regiments or other military units, and a number of monuments to important historical personages.

The concept of the botanical reserve grew from the fact that four-fifths of the Park's area remained undeveloped under a natural bushland which contained many native wildflowers. Increasing urbanisation and the loss of natural sites in and close to Perth made the retention of this bushland area a matter of scientific and aesthetic value. This function was strengthened from 1962 onwards by the establishment in the Park of a botanic garden and arboretum of thirty-four hectares for the cultivation and display of Western Australian native plants.

Recent developments have continued to contribute to the Park's aesthetic and recreational functions. A fully-equipped modern restaurant was erected in 1956, close to such features as a floral clock, a wishing well, a giant karri log and an observation platform. There are several public barbecue sites and many kilometres of pedestrian paths and tracks. The original twenty hectares of lawns and shrubberies have been materially extended by the Botanic Garden development. Four new lawns have been added within the Garden, one of which encircles a landscaped water garden with four pools, two cascades and a waterfall, one pool featuring an illuminated fountain dedicated to the pioneer women of the State. Nearby the Women's Commemorative Pavilion and Wall records 150 years of achievement of women in Western Australia and provides a venue for band concerts. A pioneer women's roll is housed in the Administrative Centre. A picnic lawn, refreshment kiosk, and children's nature playground have been established around an artificial lake at the western end of the park and linked to older-developed areas by a mile-long vista leading to a viewing tower. The lawns and pine plantations near the Subiaco entrance have been reshaped as a family recreation area with a variety of play equipment, barbecues, and a small amphitheatre for outdoor performances.

The *Zoological Gardens Board* administers the Zoological Gardens at South Perth, an area of eighteen hectares of animal enclosures, lawns and gardens. The Zoological Gardens were established in October 1898 for the collection and display of mammals, birds, reptiles and fish. The Zoo is open to the public every day of the year. During the year ended 30 June

1981, 125 species of mammals, 276 species of birds and 43 species of reptiles were exhibited. In this period 353,536 people paid for admission.

The *Rottneest Island Board* administers as a tourist and holiday resort a reserve of 1,930 hectares comprising almost the whole of Rottneest Island, which is situated about eighteen kilometres west of Fremantle. There are two settlements. One at Thomson Bay contains 172 cottages and bungalows to let, a hotel, lodge, restaurant, camping areas and all services. Recreational facilities include a golf course, tennis courts and a bowling green. The second settlement is at Geordie Bay — Longreach and provides an additional one hundred cottages, all with ocean views. This settlement is self-contained and provides all back-up facilities. The coastline is ringed by a road system with access to the various swimming and fishing areas. There is a land-backed wharf and three jetties in Thomson Bay and jetties at Geordie Bay and Green Island. Special features of the island include the marsupial known as the Quokka and the Rottneest Island Daisy. The island is served daily by air and sea transport. Visitors to the island in 1981-82 totalled 247,000.

Caves Reserves. Extensive limestone caves have been discovered at several places in the south-west part of the State. Some of them, between Cape Naturaliste and Cape Leeuwin and at Yanchep, have been developed for public inspection and certain areas of the surrounding land have been reserved, notably at Yanchep, Yallingup, Margaret River and Augusta.

Local Government Reserves. Many local authorities hold land for recreational purposes, the areas having been either Crown land vested in the Council, acquired by way of purchase, or received under private bequest. Included in these local government reserves are areas required to be surrendered to the Crown by private owners, when subdividing land into residential lots in order to provide recreational areas for the holders of lots in the subdivision. The reserves are frequently developed as public parks or to provide facilities for sports or camping.

SPORT AND RECREATION

The Department for Youth, Sport and Recreation which became operative on 1 January 1979 is responsible to the Minister for Recreation for matters relating to recreation, sport and youth.

The Department replaced the Youth, Community Recreation and National Fitness Council, a statutory authority established in 1973.

The *Youth, Sport and Recreation Act 1978* establishes a Youth, Sport and Recreation Advisory Committee.

In terms of the Act the Committee shall consist of seven members: one *ex officio* member, namely the Permanent Head of the Department; and six other members, appointed by the Governor, shall be persons from the community nominated for appointment by the Minister for their knowledge, experience or association with the administration or development of recreation, local government, sport and youth.

The role of the committee is to make recommendations to the Minister for Recreation on matters relating to community participation in recreation including sporting and youth activities.

The Department for Youth, Sport and Recreation makes recommendations to the Minister for Recreation concerning government grants to local government authorities and community groups for capital works; for special development projects; for training courses for coaches, leaders, officials and administrators; for salary subsidies to sporting and youth associations; for travel subsidies for selected persons travelling to national championships; for the purchase of items of equipment and for the establishment of regional and specialised equipment hire centres.

The Department has appointed regional recreation advisers to assist local government authorities in their planning and provision for the leisure needs of the community. These officers also participate in the planning of new, and management of existing, local recreational resources and provide an information exchange service to ensure optimum use of facilities.

Camps which provide low cost accommodation and recreation facilities for youth, sporting, recreational organisations and family groups are fully operative at Quaranup near Albany, at the historic old hospital at York, eighty kilometres east of Perth, at Sorrento on the coast north of Perth, at Point Peron on the coast south of Fremantle, at Bickley east of Perth in the Darling Range, at Guildford near Perth Airport, at Point Walter on the Swan River, at Wellington Mills near Collie, at Myalup near Harvey, at Tone River near Manjimup and at Balingup. A new recreation camp is being developed at Woodman's Point.

The Department conducts training courses, education programmes and seminars for people working in a voluntary capacity in youth, sport and recreation. A number of services which relate specifically to sport are conducted by the Western Australian Institute of Sport branch of the Department. Of particular significance are the Coaching Accreditation Scheme which trains over 1,000 sports coaches each year, and the national coaching journal *Sports Coach*. In addition, the Department works closely with agencies and individuals serving the needs and assisting with the personal development of young people. The Department has a special branch to provide services in relation to recreation opportunities for disabled people and has initiated a number of seminars, courses and information services which are aimed at improving the recreational opportunities and choices of elderly people.

The Department has an extensive equipment hire centre at its headquarters at Perry Lakes Stadium, west of Perth. A comprehensive selection of books, leaflets and other resource material is kept to assist people providing or conducting recreation programmes. A technical advice service is available to local government authorities, sporting and recreation organisations and private developers.

A 'Community and Occupational Fitness' branch was established in 1980 to promote health and fitness in the community. The branch offers a fitness assessment and counselling service, regular publications on health and fitness and particularly emphasises and promotes the value of occupational fitness programmes within the workplace.

Chapter V—continued

Part 3 — Health Services, Hospitals, and Care of the Aged and Disabled

The Commonwealth Government and State Government health authorities, together with Boards of Health under local government administration, co-operate in maintaining health services and in the prevention and control of infectious diseases in Western Australia.

NATIONAL HEALTH SERVICES

National Health Services are provided under the *National Health Act* 1953, the *Nursing Homes Assistance Act* 1974 and the *Health Insurance Act* 1973 which are administered, subject to the direction of the Minister for Health, by the Department of Health, with a Director-General as its Administrative Head. In each State there is a Director of Health, responsible to the Director-General. Benefits authorised by the National Health Act, the Nursing Homes Assistance Act and the Health Insurance Act are paid from the National Welfare Fund, to which reference is made in Chapter VI, Part 1 — *Public Finance*.

National Health Benefits

The Health Insurance Act established the Australian Health Insurance Program (Medibank) which came into operation on 1 July 1975. This programme provided medical benefits, hospitalisation without charge in standard wards of public hospitals and free out-patient treatment.

From 1 October 1976 the *Health Insurance Levy Act* 1976 imposed a levy on taxable incomes as a contribution to the health costs of standard Medibank beneficiaries. Exemption from payment of the levy could be obtained by insuring for basic medical and hospital benefits with a registered health insurance organisation.

Under amendments to the *Health Insurance Act* 1973 and the *National Health Act* 1953 effective from 1 November 1978 the compulsory health insurance levy was abolished and there was no obligation for persons to carry medical insurance. The Commonwealth provided a universal medical benefit of 40 per cent of a scheduled fee. This universal medical benefit was abolished from 1 September 1979. From that date the Commonwealth benefit was the amount by which the Schedule Fee exceeded \$20.00 for each medical service. Changes introduced from 1 September 1981 provided for a Commonwealth medical benefit of 30 per cent of the Schedule Fee, but only for persons with medical insurance cover with a registered medical benefits fund. The funds are required to pay additional benefit such that, when added to the Commonwealth benefit, the member receives 85 per cent of the scheduled fee, or the Schedule Fee less \$10.00 whichever is the greater. Persons in special need were defined by legislation (migrants for first six months in Australia, unemployment beneficiaries and low income earners) and receive a health care card.

A tax rebate of 32 cents per dollar of contributions to registered health insurance funds for basic hospital and medical insurance was introduced, retrospective to 1 July 1981.

Eligible pensioners, holders of health care cards and the dependants of such persons are eligible to receive benefits from the Commonwealth at 85 per cent of the Schedule Fee for each medical service, with a maximum patient payment of \$5.00 for any one service, where the Schedule Fee is charged.

Medical practitioners may bill the Commonwealth directly for services rendered to either persons in special need or eligible pensioners.

Hospitals

The provision of finance for recognised hospitals was based on an agreement made under the *Health Insurance Act 1973* between the Commonwealth and the State Government. The agreement operating from 1 October 1976 contained the following main points: recognised hospitals were to provide free accommodation and treatment to certain categories of patients and to make charges, at agreed rates, in respect of other categories of patients; doctors treating patients receiving free accommodation and treatment were to be paid by hospitals on certain agreed bases; and the Commonwealth Government was to meet 50 per cent of approved net operating costs of State hospital systems, expressed in aggregate budgets jointly formulated and approved.

The cost sharing agreement expired on 30 June 1981 and has been replaced by a block grant from the Commonwealth. Under the conditions of the grant the State provides accommodation and treatment in recognised hospitals for eligible pensioners, health card holders, and the dependents of such persons.

The following table shows health cash benefits to persons in Western Australia in recent years.

COMMONWEALTH GOVERNMENT HEALTH CASH BENEFITS
TO OR FOR PERSONS IN WESTERN AUSTRALIA
(\$'000)

Item	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Hospital and clinical services —						
Hospital benefits for pensioners	606	—	—	—	—	—
Hospital benefits, n.e.c.	6,257	1,225	19	9	—	—
Hospital benefits re-insurance	—	—	1,288	(a) —2,100	(a) —3,378	677
Nursing home benefits	18,772	22,228	24,384	26,390	31,149	36,418
Tuberculosis campaign — Allowances	77	62	107	68	49	54
Rehabilitation of ex-servicemen	17	30	34	34	57	65
Medibank — Private hospital daily bed payments	5,175	5,993	5,883	5,940	5,481	5,438
Other health services —						
Medical benefits for pensioners	372	—	—	—	—	—
Medical benefits, n.e.c. (b)	5,737	74	19	—	40,777	46,540
Pharmaceutical benefits for pensioners	7,104	7,609	8,469	9,917	11,047	13,346
Pharmaceutical benefits, n.e.c.	9,999	8,185	8,854	8,370	7,670	8,792
Medibank — Medical benefits (b)	42,067	35,702	21,168	36,301	—	—
Domiciliary care	847	912	877	876	900	1,501
Isolated patients assistance	—	—	—	54	352	594
Assistance to aged persons —						
Age pensions	156,447	183,519	216,111	238,241	258,650	290,394
Delivered meals	130	208	225	239	155	216
Personal care	1,160	1,403	1,420	1,630	1,800	2,194
Telephone concessions	730	846	902	944	1,199	1,249
Assistance to incapacitated and handicapped persons —						
Invalid pensions	27,066	33,666	39,321	46,592	54,228	63,269
Sheltered employment allowances	980	1,250	1,493	1,765	1,997	2,422
Handicapped children's benefits	985	1,062	1,471	1,428	1,455	1,511
Rehabilitation services	472	1,219	1,453	1,693	1,974	2,219
Assistance to unemployed and sick persons —						
Unemployment benefits	33,824	42,958	59,324	82,842	87,402	87,891
Sickness benefits	6,190	6,814	7,585	7,200	8,676	10,713
Special benefits	1,238	1,370	2,114	2,897	4,653	6,762
Structural adjustment assistance	91	1	—	—	—	—
Other	—	2	—	8	26	26
Assistance to ex-servicemen —						
War and service pensions and allowances	43,677	52,519	62,501	67,067	74,995	92,714
Other benefits	297	263	280	209	207	287
Assistance to widowed and deserted spouses —						
Widows' pensions	24,809	27,700	32,290	36,329	40,647	45,925
Assistance to families and children —						
Family allowance	22,737	89,514	90,809	88,151	89,558	84,338
Maternity allowances	632	645	625	317	—	—
Supporting parents' benefits	12,547	15,588	18,602	22,996	27,590	44,108
Orphans' pensions	101	93	118	133	142	169
Other social security and welfare programmes	313	321	346	388	420	568
Total	431,456	542,981	608,092	686,928	749,878	850,400

(a) Contribution to the national pool by health benefit funds in Western Australia. (b) Payment of Commonwealth Medical Benefits was transferred to the National Welfare Fund 1 July 1979.

From 25 June 1981 a \$28.00 per day occupied bed subsidy was introduced for persons classified as surgical patients in private hospitals. The \$16.00 per day previously paid for all occupied bed days in private hospitals continues to be paid for non-surgical patients.

Nursing Home Benefits

From 1 October 1977 changes to the *National Health Act* 1953 provided for a basic Commonwealth nursing home benefit for uninsured patients. At the same time, insured patients in nursing homes became entitled to receive the same level of benefit payable by the registered hospital benefit organisations. Also from that date the supplementary nursing home benefit for extensive care patients was increased from \$3.00 to \$6.00 per day. From 1 September 1981 the Commonwealth accepted responsibility for the payment of a basic benefit for both insured and uninsured patients.

Certain charitable and non-profit organisations conducting nursing homes are eligible to participate in an alternative subsidy scheme which provides for deficit funding under the *Nursing Homes Assistance Act* 1974.

Domiciliary Nursing Care Benefit

Domiciliary nursing care benefit is paid to assist in meeting the cost of home nursing for persons aged sixteen years or over who are chronically ill and are being cared for in the private home of a relative or other approved person. The benefit applies to a patient who has a continuing need for nursing care, and is receiving such care given by or under the supervision of a registered nurse.

Pharmaceutical Benefits

All persons receiving treatment by registered medical practitioners and participating dental practitioners are entitled to receive benefits through approved pharmaceutical chemists or, in certain circumstances, medical practitioners.

The drugs and medicinal preparations available as pharmaceutical benefits are determined by the Minister on the advice of the Pharmaceutical Benefits Advisory Committee.

Tuberculosis Medical Services and Allowances

From 1949-50, under the provisions of the *Tuberculosis Act* 1948, the Commonwealth Government reimbursed each State for approved expenditures incurred in the diagnosis, treatment and control of tuberculosis. The incidence of tuberculosis has been brought under control in Australia, and Commonwealth assistance under this programme ceased as from 31 December 1976, the costs incurred by recognised hospitals in treating tuberculosis patients being included within the scope of the Commonwealth/State cost sharing agreement.

Provision is made in the Act for allowances to be paid to sufferers from tuberculosis and their dependants. There is a means test which does not, however, apply to persons aged seventy years and over. The allowances are determined by the Director-General of Health, subject to the direction of the Minister. In certain circumstances, additional benefits may be paid in the form of a mother's or guardian's allowance or supplementary assistance.

STATE GOVERNMENT HEALTH SERVICES

The principal Statute relating to the provision and regulation of health services in Western Australia is the *Health Act 1911-1982*, which is administered, subject to the control of the Minister, by a Commissioner of Public Health. The Act is comprehensive in scope and confers on the Commissioner the powers necessary for the prevention and control of infectious diseases; the enforcement of sanitation, building and pure foods standards; the control of nuisances and offensive trades; the regulation of the sale of pesticides and the manufacture of therapeutic substances; and the registration of private hospitals and the licensing of maternity homes. Other Acts under Public Health administration are the Anatomy Act, the Clean Air Act, the Cremation Act, the Noise Abatement Act, the Poisons Act and the Radiation Safety Act.

The Public Health Department maintains a pathology laboratory service which provides diagnostic medical laboratory services to government non-teaching hospitals, charitable institutions and general practitioners who elect to use it. It also shares with the Department of Medicine of the University of Western Australia much of the diagnostic medical laboratory of the Queen Elizabeth II Medical Centre. A range of reference laboratories is available, some of which serve the whole of Western Australia. A public health epidemiological service is provided for the State; nutritional, health and other surveys are undertaken; and forensic pathology work is done for the Police Department and Crown Law Department.

The Health Education Unit of the Public Health Department, through its central and regional offices, provides training and resource material for health education activities throughout the State.

The Cancer Council of Western Australia is constituted under the provisions of the *Cancer Council of Western Australia Act 1958-1980* as a statutory body with the functions of co-ordinating, promoting and subsidising research into the cause, diagnosis, prevention and treatment of cancer.

The Western Australian Government subsidises the cost of dental care for pensioners and persons on low incomes who are treated at the Perth Dental Hospital and at its clinics in the metropolitan area and some major country centres. Co-operating dental practitioners assist in the conduct of a subsidised dental programme by the Public Health Department in other areas.

Infectious Diseases

The *Health Act 1911-1982* provides for the compulsory notification of infectious diseases and for the application of preventive measures. For the purposes of the Act, infectious diseases are those which are specified in the Act, as well as any other diseases which may, from time to time, be declared. The occupier of premises where such a disease occurs is required to notify the local authority forthwith. The medical practitioner who attends a person suffering from an infectious disease must, on the day on which he becomes aware of the nature of the disease, notify the occupier and also the local authority and the Commissioner of Public Health.

On the appearance of any epidemic, endemic or contagious disease, the local authority is required to notify the Commissioner immediately and to report periodically on the disease. The Act provides for the disinfection and cleansing of premises and for the disinfection and destruction of bedding, clothing or other articles which have been exposed to infection. The Commissioner may require any person suspected to be suffering from, or to be a carrier of, an infectious disease to submit to medical examination.

In May 1965 the National Health and Medical Research Council at its Fifty-ninth Session proposed a basic list of diseases to be notifiable in each State and Territory and the following table is based upon that proposal. The table does not include all diseases which are notifiable in Western Australia.

NOTIFIABLE DISEASES — NUMBER OF CASES NOTIFIED (a)

Disease	1976	1977	1978	1979	1980	1981
Brucellosis	—	1	—	1	3	—
Cholera	—	—	(b) 1	—	—	—
Diphtheria	—	—	—	—	—	—
Infectious hepatitis	272	211	270	127	228	160
Leprosy	20	17	15	12	9	8
Leptospirosis	1	—	1	1	9	11
Paratyphoid fever	1	1	2	—	—	3
Poliomyelitis	—	—	—	—	—	—
Tetanus	—	1	—	—	—	—
Tuberculosis	110	155	165	179	167	160
Typhoid fever	—	—	3	4	4	—
Typhus (all forms)	—	—	—	1	—	—

(a) Figures exclude cases where the original diagnosis was subsequently disproved. No cases of plague, smallpox or yellow fever were notified during the period. (b) Contracted out of State.

Leprosy and trachoma are endemic among the Aborigines of the Kimberley Division in the far north of the State, and cases are, with few exceptions, confined to the Aboriginal population. The Public Health Department and the Northern Territory Medical Service co-operate in the control of these diseases.

The Commissioner of Public Health may compel any person believed to be suffering from venereal disease to undergo examination by a medical practitioner. Any person who is aware or suspects that he or she is suffering from venereal disease is required to consult a medical practitioner and, if found to be infected, must continue treatment until a certificate of cure is issued. Free treatment is available at public hospitals. In 1981, 1,458 (1980, 1,215) cases of gonorrhoea and 230 (1980, 179) of syphilis were notified to the Department.

The State Government conducts a tuberculosis control programme throughout the State. This includes the provision of services for diagnosis and treatment as well as preventive measures. Under the *Health Act 1911-1982*, all persons in Western Australia may be required to undergo X-ray examinations, which are conducted by mobile units of the Chest and Tuberculosis Services and at the Perth and Fremantle Chest Clinics.

Health Services for Children

In addition to measures provided for immunisation against infectious diseases, the Community and Child Health Services and Dental Health Services assist in maintaining the general health of children in Western Australia.

Child Health Centres have been established throughout the State to advise mothers concerning the care of infants and pre-school children. Screening services for detecting metabolic, hearing, visual and other physical or behavioural disorders are available. Expectant parents are offered a variety of education programmes, and mothers are visited in hospital. It is estimated that over 90 per cent of infants in the State are taken to a Centre at least once in the first year of life. Child Health Sisters also visit remote areas of the State, and interview mothers who are normally dependent on advice given by correspondence.

CHILD HEALTH CENTRES

Particulars		1976	1977	1978	1979	1980	1981
Expenditure (a) (b)							
Salaries and wages	\$'000	1,218	2,515	2,925	1,854	1,984	2,334
Other	\$'000	180	361	402	254	270	289
Total	\$'000	1,398	2,876	3,327	2,109	2,254	2,623
Number of —							
Staff (c) —							
Medical officers		2	1	2	2	2	2
Nurses		120	122	139	141	147	152
Total		122	123	141	143	149	154
Child health centres (c)		205	207	208	208	221	221
Mobile clinics (c)		7	7	7	7	6	6
Total		212	214	215	215	227	227
Attendances at centres —							
Individual infants		46,240	47,752	49,544	51,172	54,295	57,169
Total attendances		274,535	276,787	287,742	289,624	296,884	305,213
Home visits by nurses		40,100	40,636	40,310	36,862	36,243	36,103

(a) Year ended 30 June. (b) Includes the School Health Section for the years 1976 to 1978. (c) At 31 December.

The School Health Section of the Community and Child Health Services provides a complete health appraisal of each child during the first year at pre-school, day-care centre or school. Subsequent screening for visual and hearing problems is carried out on two further occasions during school life. School Health Nurses are based at high schools and other groups of schools and provide counselling, first aid and health education services in addition to screening.

Medical assessment by multi-disciplinary teams is offered for children with physical, mental or learning handicaps and is available on the request of either teacher, guidance officer or parent. The Child Development Centre offers similar services at specialist level for handicapped children.

The Community Health Section offers preventive health services to disadvantaged groups within the community. This Section has brought a much higher standard of both preventive and therapeutic health care to children of the Aboriginal community and other minority groups through collaboration with the Child Health and School Health Sections, and with hospitals throughout the State.

Under the School Dental Services scheme preventive dentistry centres, staffed by school dental therapists trained at the Public Health Department's School of Dental Therapy, are progressively being established throughout the State. Dental therapists, under the direction of dental officers, also provide free dental care for pre-school and primary school children, and in country areas not served by private practitioners school dental officers provide a service for adults as well as for children.

OTHER HEALTH SERVICES

Quarantine

The *Quarantine Act* 1908 provides for the quarantine of humans, animals and plants. Human quarantine is concerned primarily with the procedures necessary to exclude quarantinable diseases, namely plague, cholera, yellow fever, typhus fever, lassa fever, Marburg virus disease and such other diseases as may be declared under the Quarantine Act. Animal quarantine regulates the importation of animals and animal products from overseas, and plant quarantine the importation of all plants and plant products, with the object of excluding plant diseases, insect pests and weeds. In respect of interstate movements of animals and plants, the Quarantine Act becomes operative only when it is considered that Commonwealth Government action is necessary for the protection of any State or States, and in general the control of interstate movements of animals and plants is the responsibility of State Governments. The administration of the Quarantine Act is a function of the Commonwealth Department of Health.

Royal Flying Doctor Service of Australia

The Royal Flying Doctor Service of Australia is a non-profit organisation financed by grants from the Commonwealth and State Governments and by private donations. The principal function of the Service is to provide aerial medical services for residents in remote areas. Isolated townships, mining centres and sheep and cattle stations are usually equipped with two-way radio sets and, by this means, are linked with bases where doctors are available for radio consultation in the event of sickness or accident. In serious cases a doctor flies to the patient, who may then be flown to hospital for treatment. The Service provides, through the Commonwealth Department of Health, standard medical chests with directions for the use of the drugs and medical supplies which they contain.

The radio network of the Royal Flying Doctor Service is regularly used in the work of Schools of the Air conducted by the Education Department, and also for the transmission and receipt of telegrams. In addition, it may be used, as the need arises, in connection with flood relief, in searching for lost parties and during cyclones.

The following table gives particulars of the operations of the Western Australian Section of the Service during the six years ended June 1981.

**ROYAL FLYING DOCTOR SERVICE OF AUSTRALIA
OPERATIONS OF WESTERN AUSTRALIAN SECTION**

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Expenditure (operational) \$'000	796	1,086	1,454	1,828	2,359	2,786
Number of —						
Medical flights	1,477	1,693	1,988	2,427	2,107	2,589
Miles flown	969,356	1,019,094	1,219,562	1,431,275	1,168,827	1,221,881
Patients transported	2,745	2,787	3,302	4,570	3,758	4,314
Patients attended	15,825	16,021	16,578	18,046	11,619	20,645
Radio and telephone consultations	1,761	1,812	1,033	1,116	1,108	863

The St John Ambulance Association

The St John Ambulance Association is responsible for the road ambulance service and for teaching first aid throughout Western Australia. The Association also co-operates closely with the Royal Flying Doctor Service in transporting patients by air throughout the State.

The Association is a non-profit organisation. The main sources of finance are charges on users of the service, members' contributions to the Ambulance Benefit Fund, donations by individuals, and grants from the State Government and the Lotteries Commission.

The Perth Metropolitan district and larger country towns have ambulances manned by paid ambulance officers. Smaller country towns are serviced by volunteer officers. Ambulance officers are trained to give emergency care and life support to people who are seriously ill or injured and to provide nursing care when transporting patients to hospitals and medical centres.

First aid courses, taught by paid and voluntary staff, are provided by the Association. Emphasis is laid on practical involvement of students. The Medic Alert Foundation is administered and serviced by the Association in Western Australia. Medic Alert provides a service which ensures that persons who have a medical problem receive appropriate treatment in the event of accident or collapse.

The following table gives particulars of The St John Ambulance Association for the years ended December 1976, 1977 and 1978 and the years ended 30 June 1980 and 1981.

**THE ST JOHN AMBULANCE ASSOCIATION
WESTERN AUSTRALIA**

Particulars	1976	1977	1978	1979-80	1980-81
Ambulance service, Perth —					
Patient calls	32,452	33,656	36,882	40,373	43,322
Kilometres travelled	766,275	792,477	873,451	997,213	1,086,738
First aid classes —					
Certificates issued	6,311	7,398	7,370	6,576	8,174

Miscellaneous Health Services

Other expenditure by the Commonwealth Government on health services includes the cost of district health laboratory services, the free supply of certain prophylactic materials and biological products (e.g. poliomyelitis vaccine), the supply and maintenance of hearing aids for children and pensioners, subsidies to various voluntary organisations conducting home nursing services that are assisted by the State Governments or local government authorities, the supply of artificially produced radio-active isotopes to private medical practitioners and hospitals for medical treatment purposes, and expenses in connection with the blood fractionation plant of the Commonwealth Serum Laboratories.

HOSPITALS OTHER THAN MENTAL HOSPITALS

Commonwealth Government Hospitals

The Repatriation General Hospital at Hollywood provides free treatment for certain recipients of pensions payable under the Repatriation Act and for their dependants. Free treatment is also available to some other categories of former members of the defence forces and their dependants.

State Government and Government-assisted Hospitals

The *Hospitals Act 1927-1981* is administered, subject to the direction of the Minister for Health, by the Hospital and Allied Services Department. For administrative purposes, a hospital under the direct control of this Department is classified as 'departmental' and is financed from State funds. A hospital classified as a 'Board' hospital has its own board of management and is subsidised by the State Government.

The principal government and government-assisted hospitals in the metropolitan area are the Royal Perth Hospital, Fremantle Hospital, Sir Charles Gairdner Hospital, King Edward Memorial Hospital for Women, Princess Margaret Hospital for Children, the Homes of Peace for the Chronic Sick, the Perth Dental Hospital, and Mount Henry Hospital and Sunset Hospital for long-term patients. Outside the metropolitan area the principal hospitals are located in the regional centres of Albany, Bunbury, Carnarvon, Derby, Geraldton, Kalgoorlie, Narrogin, Northam and Port Hedland.

Details of the activities of departmental and Board hospitals during the six years ended 30 June 1981 are given in the following table.

DEPARTMENTAL AND BOARD HOSPITALS (a)

Particulars		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Expenditure —							
Capital funds	\$'000	33.938	34.652	34.220	41.368	40.623	36.979
Hospital Fund —							
Establishment and domestic (b)	\$'000	21.765	26.264	29.496	26.893	28.382	17.129
Salaries and wages	\$'000	139.707	166.057	187.282	203.170	227.193	254.889
Other	\$'000	52.620	67.191	72.430	88.119	102.113	134.265
Tuberculosis	\$'000	1.160	—	—	—	—	—
Total	\$'000	249.191	294.164	323.428	359.550	398.311	443.262
Number of —							
Hospitals (c) —							
Departmental		50	49	49	49	50	50
Board		57	58	58	58	57	56
Total		107	107	107	107	107	106
Beds (d) —							
Departmental		3,400	3,567	3,573	3,479	3,429	3,406
Board		4,584	4,614	4,603	4,681	4,639	4,512
Total		7,984	8,181	8,176	8,160	8,068	7,918
Staff (c) —							
Medical		759	843	842	886	915	839
Nursing		7,339	7,717	7,870	7,977	8,228	8,673
Other		7,809	8,246	8,783	8,992	8,833	9,478
Total		15,907	16,806	17,495	17,855	17,976	18,990
In-patients —							
At beginning of year		5,706	6,235	6,153	5,913	5,735	6,111
Admissions		206,550	217,667	229,074	232,095	235,544	235,285
Discharges		202,581	214,408	225,959	228,549	231,288	231,551
Deaths		3,440	3,341	3,355	3,724	3,903	3,874
At end of year		6,235	6,153	5,913	5,735	6,088	5,971
Average daily number resident		5,716	5,731	5,827	5,924	5,981	5,837
Out-patients —							
Individuals		818,752	1,002,010	n.a.	n.a.	n.a.	n.a.
Treatments		1,731,752	1,766,256	2,707,298	2,948,781	2,980,340	2,635,114

(a) Includes particulars of the Perth Dental Hospital, and Mount Henry Hospital and Sunset Hospital for long-term patients. (b) Maintenance of equipment, furnishings and minor repairs. (c) At 30 June. (d) At 31 July.

As previously indicated, the control of tuberculosis is carried out under the direction of the Commissioner of Public Health. The principal institution for the treatment of tuberculosis is the Sir Charles Gairdner Hospital at Nedlands.

Leprosy, which is confined almost entirely to the far north of the State, is treated at a leprosarium at Derby in the Kimberley Division, operated by the Public Health Department.

Private Hospitals and Nursing Homes

In addition to the government hospitals there are a number of private general and maternity hospitals, which are registered and inspected by the Public Health Department. The principal private hospitals are those established by religious bodies in the metropolitan area and the main country towns. These include the Hospitals of Saint John of God at Subiaco, Rivervale, Bunbury and Geraldton; Saint Anne's, Mount Lawley; Bethesda Hospital, Claremont and Saint Joseph's Hospital, Bicton.

At 1 January 1982 there were 121 private hospitals and nursing homes in Western Australia with a total bed capacity of 6,136 at that date.

MENTAL HEALTH SERVICES

The *Mental Health Act 1962-1979*, which consolidates and amends the law relating to the treatment of mental disorders, came into operation on 1 July 1966. The Mental Health Services established under the Act are administered, subject to the control of the Minister for Health, by the Director of Mental Health Services. The Director must be a psychiatrist and is appointed by the Governor. Institutions authorised by the Act include approved hospitals for the treatment of mental illness, out-patient and child guidance clinics, day care facilities, training centres, hostels, sheltered workshops and domiciliary services for psychiatric patients and for the intellectually handicapped.

The following table shows particulars concerning the various mental health service units operated by the Mental Health Services authority during the year ended 30 June 1981.

MENTAL HEALTH SERVICES — YEAR ENDED 30 JUNE 1981

Particulars		Approved psychiatric hospitals	Psychiatric outpatient and day patient facilities (a)	Other psychiatric residential units	Intellectually handicapped residential units	Intellectually handicapped outpatient and day patient facilities	Rehabili- tation units	Central services
Expenditure —								
Salaries and wages	\$'000	18,563	3,406	745	12,697	2,997	1,099	5,887
Other	\$'000	4,003	605	185	2,040	379	316	1,150
Total	\$'000	22,566	4,011	930	14,737	3,376	1,415	7,037
Number of (b) —								
Units		4	25	2	23	15	2	..
Beds		893	—	103	647	—	—	..
Staff —								
Medical		40	20	—	1	5	—	3
Nursing		813	41	29	728	45	3	22
Other		489	126	19	238	34	70	421
Total		1,342	187	48	967	84	73	446
Patients at beginning of year		1,878	—	89	564	—	—	..
Admissions		1,709	—	76	1,517	—	—	..
Discharges (c)		1,799	—	77	1,477	—	—	..
Patients at end of year		1,788	—	88	604	—	—	..
Attendances		—	122,170	—	—	33,291	80,956	..
Persons attending		—	10,379	—	—	1,606	543	..

(a) Includes details for Community Psychiatric Division, Community Development Centre and the Creative Expression Unit. (b) At 30 June. (c) Includes deaths.

The Act provides for the admission of patients to hospitals approved for the purpose, either on referral by a medical practitioner or by order of a Justice of the Peace supported by the referral of a medical practitioner. A person so received into a hospital must be examined within seventy-two hours by the superintendent or another psychiatrist, and admission as a patient is dependent upon the result of the examination. Unless found to be in need of treatment, the person is required to leave the hospital. Special provisions exist for the detention for observation or treatment of persons admitted by order of a court or from a prison. The Act also provides for voluntary admissions. A person not less than eighteen years of age may be granted admission on his own request. Younger persons may be admitted on the application of a parent or guardian.

Except in the case of a person admitted by order of a court or from a prison, a patient may be released on leave or discharged by the hospital superintendent. A Board of Visitors or the Supreme Court of Western Australia may also, after due consideration, order the release of a patient. Where application for the discharge of a voluntary patient is made either by the patient himself or, in the case of a patient under the age of eighteen years, by the parent or guardian at whose request the patient was admitted, he must be discharged within seventy-two hours.

Establishments designated as approved hospitals within the meaning of the Act are Graylands Hospital, Swanbourne Hospital, Lemnos Hospital and Heathcote Hospital.

The Commonwealth Government is empowered by the *Mental Health and Related Services Assistance Act 1973* to provide financial assistance to States, local governing bodies and voluntary organisations in respect of services or facilities in relation to mental illness, mental disability, alcoholism and drug dependence. The Act came into operation on 27 November 1973 replacing the *States Grants (Mental Health Institutions) Act 1964* which expired on 30 June 1973.

CARE OF AGED AND DISABLED PERSONS

Part 4 of this Chapter gives particulars of pensions, allowances and some other benefits available to aged and disabled persons under the provisions of the Social Services Act and the Repatriation Act. Forms of assistance extended to such persons by other Commonwealth Acts are dealt with below.

Aged or Disabled Persons Homes Act

The *Aged or Disabled Persons Homes Act 1954* incorporates the *Aged Persons Homes Act 1954* and extends its provisions to include disabled persons. The purpose of the legislation is to enable the Commonwealth Government to give financial assistance to religious, charitable and other organisations in providing accommodation for the aged or disabled. The Act is administered, subject to any directions of the Minister, by the Director-General of Social Security.

AGED OR DISABLED PERSONS HOMES GRANTS WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Grants approved (a) — Number	5	7	14	5	15	13
Persons accommodated — Type of accommodation —						
Self-contained	108	36	72	20	82	50
Hostel	—	—	10	50	68	11
Nursing	—	85	—	—	45	397
Total persons	108	121	82	70	195	458
Amount S'000	1,335	1,933	978	1,100	2,073	4,888

(a) A supplementary grant may be approved in a year subsequent to the year when the original grant was approved. In this table each supplementary grant has been included in the year in which the additional amount was actually approved.

For the purposes of the Act, the term 'aged person' means a man aged sixty-five years or over or a woman aged sixty years or over and includes the spouse of the aged person; 'disabled person' means a person who has attained the age of sixteen years and who is permanently blind or permanently incapacitated for work but does not include the spouse of that person unless the spouse is also disabled. Grants are made to organisations 'to encourage and assist the provision of suitable homes for eligible persons, and in particular homes at which eligible persons may reside in conditions approaching as nearly as possible normal domestic life . . .'. The legislation authorises grants to eligible organisations to be applied towards the cost of erecting or purchasing approved homes to be used permanently for the accommodation of aged or disabled persons. To be eligible for assistance an organisation must be one which is carried on otherwise than for the purpose of profit or gain to its individual members, and may be a religious, charitable or benevolent organisation, an organisation of former members of the defence forces, an organisation approved by the Governor-General, or a local governing body. An organisation conducted or controlled by the Commonwealth Government or a State Government is not eligible for assistance. Grants are made from moneys appropriated by the Parliament from the Consolidated Revenue Fund and from 20 May 1976 were made on the basis of \$2 for each \$1 raised by the organisation. There is a maximum subsidy limit based on the number of persons to be housed in the new accommodation.

On 20 May 1976 the Commonwealth Government announced a three-year programme to provide funds for the establishment of accommodation for eligible persons. The programme is designed to give organisations, where projects have been approved, the opportunity to proceed with planning, and in some instances construction, on the basis of a forward subsidy commitment by the Government. On 18 December 1979 the Government announced an extension of the programme for a further three years commencing on 1 July 1980.

Personal Care Subsidy. An amendment to the Aged Persons Homes Act operative from 10 October 1969 provided for payment of a Personal Care Subsidy to approved homes in respect of residents eighty years of age or over. A further amendment in December 1974, extended the subsidy to certain residents who had not attained eighty years of age. Homes eligible for the subsidy are those where residents are provided with all meals and where staff is employed to assist residents who need help with bathing, dressing, personal laundry and the cleaning of their rooms, and those who need help with medication.

The *Aged or Disabled Persons Homes Act 1954* authorises the payment of subsidy at the rate of \$15 per week in respect of each person residing in approved premises who has attained the age of eighty years or is receiving approved personal care services. Payments are made from the National Welfare Fund.

PERSONAL CARE SUBSIDY — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of approved premises (a)	55	61	63	68	69	74
Number of qualified residents (a)	1,478	1,801	1,906	1,966	2,726	2,276
Amount of subsidy paid \$'000	1,160	1,402	1,420	1,630	1,800	2,194

(a) At 30 June.

Homeless Persons Assistance Act

The *Homeless Persons Assistance Act 1974*, which came into operation on 13 December 1974, authorises the Commonwealth Government to make grants to charitable and other organisations providing temporary accommodation, meals and personal services for the homeless. Grants may be made in respect of the acquisition of land, buildings and furniture; the rent of premises; the salaries of social welfare workers (including social workers, welfare officers, psychologists and occupational therapists); and the provision of accommodation and meals.

The homeless persons assistance programme was reviewed after its initial three years (the prescribed period in the Act) and was subsequently extended on two occasions.

The *Homeless Persons Assistance Amendment Act* 1979 which received assent on 19 November 1979 removed all reference to a prescribed period in the principal legislation and effectively secured the future of the programme.

The following table gives particulars of grants made to organisations in Western Australia in the period to 30 June 1981.

HOMELESS PERSONS ASSISTANCE GRANTS WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
	\$	\$	\$	\$	\$	\$
Building projects	60,092	57,280	483,997	63,212	9,549	120,500
Rent of premises	11,787	29,916	42,908	46,325	48,216	56,890
Furniture and equipment	3,162	26,492	5,651	7,738	4,927	—
Staff salaries	5,459	11,566	18,254	23,518	32,399	50,555
Food and accommodation	33,506	39,784	58,797	69,331	78,498	131,094
Meals for non-residents	7,620	10,869	11,124	17,123	19,507	60,998
Total	121,626	175,907	620,731	227,247	193,096	420,037

Aged Persons Hostels Act

The *Aged Persons Hostels Act* 1972 is administered, subject to any directions of the Minister, by the Director-General of Social Security. The Act authorises the Commonwealth Government to assist in the provision of additional hostel-type accommodation for aged persons by making grants to organisations which satisfy certain conditions related to existing accommodation. The first grants in respect of organisations in Western Australia were approved during the year ended 30 June 1974. The Act expired on 27 November 1975 but amendments allowed an extension of time for the completion of projects approved in principle. No new grants were made in 1975-76 but capital grants totalling \$338,435 were provided in that year in respect of projects approved in 1974-75. The *Aged Persons Hostels Amendment Act* 1976, which came into operation on 20 September 1976 preserves the rights of organisations which had been accepted during the time period of the original Act but had been deferred during 1975-76.

AGED PERSONS HOSTELS GRANTS WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of grants	—	10	5	1	4	4
Persons accommodated —						
Hostel beds	—	168	129	8	91	124
Staff beds	—	9	6	—	4	3
Total	—	177	135	8	95	127
	\$	\$	\$	\$	\$	\$
Amount of grants —						
Capital grants	(a) 338,435	2,944,883	2,297,992	201,535	1,571,316	2,385,182
Furnishing grants	—	44,250	36,750	2,000	23,750	31,750
Total	338,435	2,989,133	2,334,742	203,535	1,595,066	2,416,932

(a) Approved in 1974-75.

Delivered Meals Subsidy Act

The *Delivered Meals Subsidy Act* 1970 is administered, subject to any directions of the Minister, by the Director-General of Social Security. Its purpose is to enable help to be given to approved organisations to establish, maintain, expand and improve services for the delivery of meals to aged and invalid persons. To qualify for approval, an organisation must conduct a regular service delivering meals wholly or mainly to aged or invalid persons in their homes.

The Act authorises payment of subsidy at the rate of 40 cents per meal, which is increased to 45 cents if the meal includes fresh fruit or fruit juice. Payments are made from the National Welfare Fund.

Handicapped Persons Assistance Act

The *Handicapped Persons Assistance Act* 1974, which repealed the *Handicapped Children (Assistance) Act* 1970 and parts of the *Sheltered Employment (Assistance) Act* 1967 consolidates and extends the Commonwealth Government's programmes of assistance to voluntary organisations concerned with the welfare of handicapped persons. The Act is administered, subject to any directions of the Minister, by the Director-General of Social Security.

The Act provides that grants may be made to eligible organisations which are deemed by the Minister to provide 'prescribed services' for disabled persons. Prescribed services which may be approved for the purposes of the Act include training, activity therapy, sheltered employment, residential accommodation, holiday accommodation, recreational facilities and rehabilitational facilities. Assistance may be provided towards meeting the cost of purchase or construction of premises to provide the prescribed services. The Act allows the payment of subsidy in respect of residential accommodation to be extended to include accommodation for disabled persons capable of engaging in normal employment. Subsidies may also be approved to help meet expenditure on building maintenance, rental of premises, equipment, and the salaries of certain staff involved in providing prescribed services. The Act also authorises the payment to organisations of a training fee for each person who, after being employed for six months or longer in a sheltered workshop, has spent at least twelve months in normal employment.

On 7 November 1976 the Minister for Social Security announced details of a Commonwealth three-year programme designed to provide new facilities for mentally and physically handicapped people, and to provide continuing support for existing facilities. An extension of this programme for a further three years was announced in January 1980.

The handicapped children's benefit, formerly payable in terms of the National Health Act, is continued under the provisions of the *Handicapped Persons Assistance Act* 1974. A handicapped child is defined as a person under sixteen years of age who is suffering from a physical or mental disability. An eligible organisation which provides approved residential accommodation for handicapped children is entitled to receive benefit in respect of each such child at the rate of \$5.00 for each day on which accommodation is provided for the child.

The following table shows expenditure during the three years ended 30 June 1981.

HANDICAPPED PERSONS ASSISTANCE ACT
ANNUAL EXPENDITURE — WESTERN AUSTRALIA
(\$)

Particulars	1978-79	1979-80	1980-81
Capital	1,404,080	267,619	1,033,518
Equipment	361,203	239,137	301,425
Maintenance	22,108	35,781	30,564
Rent	90,733	86,255	126,786
Salary	2,840,811	3,270,631	4,049,977
Training fee	1,000	—	—
Total	4,719,935	3,899,423	5,542,270

Sheltered Employment Allowances

Sheltered employment allowances, which were introduced in terms of the *Social Services Act* 1967, enable invalid pensioners and certain other disabled persons to earn an income from sheltered employment and at the same time to be eligible to receive a special allowance which, in the case of an invalid pensioner, replaces the pension. An additional incentive allowance of \$8 per week is paid to those receiving the sheltered employment allowance.

Other Forms of Assistance

The *States Grants (Paramedical Services) Act* 1969 authorises the Commonwealth Government to share with a State on a \$1 for \$1 basis the cost of approved paramedical services, such as chiropody, occupational therapy, physiotherapy and speech therapy, provided wholly or mainly for aged persons in their homes. Payments are made from the Consolidated Revenue Fund and the maximum annual expenditure authorised by the Act is \$250,000, of which \$19,000 is payable to Western Australia. In the period to 30 June 1981, no grant had been made to Western Australia.

Under the *State Grants (Home Care) Act* 1969 the Commonwealth Government shares with a State on a \$2 for \$1 basis the cost of approved housekeeping or other domestic services provided wholly or mainly for aged persons in their homes. It also shares with a State the cost of providing approved senior citizens' centres, on a \$2 for \$1 basis up to a maximum of two-thirds of the capital cost of the centres, as well as paying half of the salary of a welfare officer engaged in the co-ordination of home care services and associated with a senior citizen's centre. Grants to Western Australia were first made in the year 1970-71.

The following table shows particulars of grants made during the six years ended 30 June 1981.

HOME CARE SERVICES GRANTS — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
	\$	\$	\$	\$	\$	\$
Amount of grants paid for —						
Home care services	84.817	57.333	56.000	43.667	52.250	57.250
Senior citizens' centres	343.855	406.400	348.473	99.864	174.034	360.961
Welfare officers	41.831	56.199	55.990	65.171	69.953	96.587
Total	470.503	519.932	460.463	208.702	296.237	514.798

Chapter V— continued

Part 4 — Social Benefits, Pensions and Welfare Services

The conditions relating to payment of the several benefits dealt with in this Part are described *as they existed at 1 January 1982*. The information given is intended to serve only as a general guide to the main provisions relating to social security and repatriation benefits provided by the Commonwealth Government and relief payments made by the State Government. Information relating to health services and benefits is shown in Part 3. The Commonwealth Government's social security programme is designed to provide protection against economic hardship caused by loss of earnings which results from age, temporary illness, permanent disability or unemployment. It also makes provision for lack of financial support owing to the absence of a supporting spouse through death, desertion or separation, and for the necessity of a lone male parent to forgo employment in order to care for a child. Another aim of the system is to help parents with expenses associated with the rearing of children. It is designed also to compensate veterans for disabilities caused by war service and to assist the dependants of those who died as a result of war service.

This assistance may take the form of (a) financial aid to or for institutions, organisations or authorities or (b) regular cash payments to or on behalf of individuals, which may be either selective benefits (i.e. subject to an income test) such as age and invalid pensions and widows' pensions, or universal benefits (i.e. free of income test). In addition, there is provision for a wide range of welfare services for people with special needs (e.g. invalids and other persons may be trained so that they can re-enter paid employment).

Pensions and other benefits provided under the Social Services Act and health services provided under the National Health Act are financed from the National Welfare Fund. Other payments from the fund include allowances to sufferers from tuberculosis. The fund receives each year by transfer from the Consolidated Revenue Fund an amount equal to the payments made. Other income of the National Welfare Fund is derived from interest on investments. Details of expenditure in Western Australia since the fund was established in 1943 are given in the *Statistical Summary* following Chapter X.

Disability pensions, service pensions, and allowances provided under the Repatriation Act and services provided under the Health Insurance Act are financed from the Consolidated Revenue Fund.

The State Government makes certain payments for the relief of persons in necessitous circumstances which in most cases supplement benefits provided by the Commonwealth Government (see text *State Relief Payments* near the end of this Part).

BENEFITS PAYABLE UNDER SOCIAL SERVICES ACT

Rates of Benefit

The following table shows the maximum weekly rates applying to age and invalid pensions, sheltered employment allowances, widows' pensions, supporting parents' benefits, and unemployment and sickness benefits. The rates shown apply also to service pensions.

MAXIMUM WEEKLY RATES OF BENEFIT

Pension, benefit or allowance	Rate current at —					
	November 1978	November 1979	May 1980	November 1980	May 1981	November 1981
Single (i.e. unmarried) rate —						
Aged 16 or 17 years (a)	36.00	36.00	36.00	36.00	36.00	36.00
Aged 18 years or more	53.20	57.90	61.05	64.10	66.65	69.70
Married rate (combined)	88.70	96.50	101.70	106.80	111.10	123.60
Each dependent child, including student child	7.50	7.50	7.50	10.00	10.00	10.00
Guardian's (or mother's) allowance (b) —						
Where there is a child aged under 6 years or an invalid child requiring full-time care	6.00	6.00	6.00	8.00	8.00	8.00
Other cases	4.00	4.00	4.00	6.00	6.00	6.00
Supplementary assistance (c)	5.00	5.00	5.00	5.00	5.00	5.00

(a) Rate applies to recipients of unemployment and sickness benefits only. (b) Guardian's allowance payable to unmarried pensioner recipient of sheltered employment allowance having the care of one or more dependent children, including student children. Mother's allowance payable to Class A widow pensioner or recipient of supporting parent's benefit. (c) Payable where pensioner or beneficiary is wholly or substantially dependent on the pension or benefit and is paying rent or lodging charges.

Age and Invalid Pensions and Allowances

AGE AND INVALID PENSIONS — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of pensioners at 30 June —						
Age —						
Males	28,282	29,127	32,578	33,491	34,320	34,935
Females	55,805	57,343	61,913	63,067	64,567	66,107
Wives of age pensioners	2,460	2,500	2,656	2,773	2,813	2,708
Persons	86,547	88,970	97,147	99,331	101,700	103,750
Invalid —						
Males	7,730	8,674	9,076	10,264	10,941	11,301
Females	4,535	4,589	4,577	4,781	4,953	5,051
Wives of invalid pensioners	2,586	3,493	3,139	3,787	4,163	4,262
Persons	14,851	16,756	16,792	18,832	20,057	20,614
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Amount paid during year (a) —						
Age pensions	156,447	183,519	216,111	238,241	258,650	290,394
Invalid pensions	27,066	33,666	39,321	46,592	54,228	63,269
Total	183,513	217,185	255,432	284,833	312,878	353,663

(a) Includes amounts paid to benevolent homes for maintenance of pensioners and to pensioner inmates of these homes. Includes also allowances and supplementary assistance.

Age Pensions. Age pensions are payable, subject to residence qualification and an income test, to women aged sixty years or more and men aged sixty-five years or more. A period of ten years continuous residence is usually necessary. The income test does not apply to persons aged seventy years or more, although payment at a rate higher than the May 1978 level for these persons is subject to an income test.

A wife's pension, subject to an income test, is payable to the wife of an age pensioner if she is not eligible for an age, invalid or service pension in her own right.

Additional payments are made to pensioners with dependent children. These additional payments are subject to an income test. Supplementary assistance is payable, subject to a special income test, to pensioners who are required to pay rent, lodging or board and lodging charges. On the death of one of a married pensioner couple, the surviving member may become entitled to receive, for up to six fortnightly instalments, the equivalent of the two pensions that would have been paid if the spouse had not died. Single age pensioners with a dependent child or children are also eligible for guardian's allowance (in place of mother's allowance).

Invalid Pensions. Invalid pensions are payable to persons aged not less than sixteen years who, while resident in Australia, become either permanently incapacitated for work to the extent of at least 85 per cent or permanently blind. Pensions are subject to an income test except in the case

of those who are permanently blind. No qualifying period of residence in Australia is necessary unless the incapacity occurred outside Australia, in which case the residence qualification is the same as that for an age pension.

A wife's pension is payable to the wife of an invalid pensioner if she is not eligible for age pension, invalid pension or service pension in her own right. Invalid pensioners are eligible for the same additional payments as age pensioners and the rates of benefit are the same.

Sheltered Employment Allowances

Sheltered employment allowances are payable to disabled persons who are qualified to receive an invalid pension or who would become so qualified if they ceased to be provided with sheltered employment. The allowance is subject to the same income test as that which applies to the invalid pension, and the rates of benefit are the same.

Details of sheltered employment allowances for the six years ended 1980-81 are given in the following table.

SHELTERED EMPLOYMENT ALLOWANCES — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of (a) —						
Workshops paying allowances	11	12	11	11	11	11
Employees receiving allowances	420	481	504	642	699	735
Expenditure on allowances \$'000	980	1,250	1,493	1,765	1,997	2,422

(a) At 30 June.

Funeral Benefits

A funeral benefit up to a maximum of \$20 is payable to any person liable for the funeral costs of an age or invalid pensioner. The deceased must have been in possession of or eligible for a pensioner health benefit card. A higher benefit, up to a maximum of \$40 is payable to an age, invalid or widow pensioner liable for the funeral costs of a spouse, a child or another such pensioner. Only pensioners in possession of or eligible for a health benefit card can claim this benefit.

Widows' Pensions and Allowances

Pensions are payable to widows, subject to an income test. No period of residence is necessary if a woman and her husband were residing permanently in Australia when she became a widow. In other cases, five years' continuous residence immediately preceding lodgment of claim is necessary but this requirement is waived in the case of a woman widowed overseas who returns to Australia, provided she had resided continuously in Australia for ten years at any time.

WIDOWS' PENSIONS — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of pensions current at 30 June —						
Class A pensioners	5,058	5,230	5,535	5,921	5,942	5,775
Class B pensioners	4,957	5,442	5,948	6,301	6,524	6,738
Class C pensioners	12	19	11	10	10	13
Total	10,027	10,691	11,494	12,232	12,476	12,526
Amount paid during year (a) \$'000	24,809	27,700	32,290	36,329	40,647	45,925

(a) Includes allowances and supplementary assistance.

There are three classes of widow pensioners: Class A — a widow with one or more dependent children in her care; Class B — a widow without dependent children who is at least fifty years of age, or is not less than forty-five years of age when her Class A pension ceases because she no longer has a dependent child in her care; and Class C — a widow under fifty years of age without dependent children who is in necessitous circumstances at the time of her husband's death or within twenty-six weeks thereafter. For all classes, the term 'widow' includes a woman who was the common-law wife of a man for at least three years immediately

before his death. For Classes A and B, the term includes a wife who has been deserted for six months, a divorcee, or a woman whose husband has been imprisoned for six months.

Widow pensioners are eligible for supplementary assistance, additional payments for dependent children, and mother's allowance (in place of guardian's allowance) at the same rates and subject to the same conditions as age and invalid pensioners.

Supporting Parent's Benefit

The supporting parent's benefit is designed to assist an unmarried parent or a parent who is a separated *de facto* husband or wife, *de facto* husband or wife of a prisoner, a separated husband or wife, or a sole parent supporting a child for any other reason.

Unemployment, Sickness and Special Benefits

Unemployment and sickness benefits are available, subject to an income test, to persons who are unemployed and have suffered loss of income because they are unemployed or are temporarily incapacitated for work. There is a waiting period of seven days before benefits are paid. Where a claimant for unemployment benefit does not lodge a claim immediately after becoming unemployed, the waiting period of seven days may commence in the week before the claim is made if the Director-General is satisfied that for each day in that week the person was capable of undertaking and willing to undertake suitable work and had taken reasonable steps to obtain work. A special benefit may be paid in the waiting period of seven days if the claimant is suffering hardship or in certain cases payment of unemployment benefit can be advanced.

A special benefit may be paid to a person ineligible for a pension or for an unemployment or sickness benefit, if he is unable to earn a sufficient livelihood for himself and his dependants and is suffering hardship.

UNEMPLOYMENT, SICKNESS AND SPECIAL BENEFITS — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	(a) 1978-79	1979-80	1980-81
Unemployment benefit —						
Number admitted to benefit during year	84.625	75.059	85.822	94.500	(b) 88.700	87.231
Average number on benefit at end of each week	13.598	15.706	20.470	29.000	(b) 29.800	28.638
Number on benefit at end of year —						
Males	9.499	12.895	17.934	20.700	20.589	19.888
Females	5.055	6.047	7.686	9.300	9.506	9.386
Persons	14.554	18.942	25.620	30.000	30.095	29.274
Sickness benefit —						
Number admitted to benefit during year	15.211	14.589	13.582	12.200	(b) 13.200	13.408
Average number on benefit at end of each week	2.034	2.388	2.487	2.400	(b) 2.700	3.161
Number on benefit at end of year —						
Males	1.838	2.063	2.007	1.900	2.332	2.538
Females	481	487	497	500	743	857
Persons	2,319	2,550	2,504	2,400	3,075	3,395
Special benefit (c) —						
Number admitted to benefit during year	4.261	3,782	4,306	5,300	(b) 6,850	7,872
Average number on benefit at end of each week	529	536	670	900	(b) 1,400	1,840
Number on benefit at end of year —						
Males	163	251	304	500	990	1,165
Females	343	346	373	600	821	991
Persons	506	597	677	1,100	1,811	2,156
Benefits paid (d) during year —	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Unemployment	33.824	42.958	59.324	82.842	87.402	87.891
Sickness (e)	6.190	6.814	7.585	7.200	8.676	10.713
Special (c)	1.238	1.370	2.074	2.586	4.336	6.208
Total (c)	41.252	51.142	68.983	92.628	100.414	104.812

(a) With the exception of benefits paid, figures are estimated. (b) Estimated. (c) Excludes special benefits to migrants in accommodation centres. (d) Amount includes additional benefit for children and dependent students. (e) Includes supplementary allowance.

To be eligible for unemployment or sickness benefit, a person must be at least sixteen years of age and under sixty, in the case of a female, or under sixty-five, in the case of a male. The claimant must also have lived in Australia for at least a year immediately before applying for benefit, or have the intention of remaining in Australia permanently.

Except for unmarried beneficiaries the rates of benefit are the same as for the basic pension. A beneficiary with a dependent child or children is eligible for an additional benefit for each dependent child. After having received benefit for six consecutive weeks, a sickness beneficiary is also eligible, subject to a special means test, to receive supplementary assistance if paying rent or lodging charges. This assistance is not payable to a beneficiary who is in hospital and who has no dependants.

Rehabilitation Service

The Commonwealth Rehabilitation Service is designed to restore disabled persons as fully as possible to physical, mental, social and vocational usefulness. Treatment and training are available free of charge to a person with a physical or mental disability who is eligible in terms of the Social Services Act and for whom there are reasonable prospects of his engaging in a suitable vocation. Eligible persons include persons receiving or claiming benefits and persons who have attained the age of fourteen years and who, without that treatment or training would be likely to become qualified to receive pensions on attaining the age of sixteen years.

The Commonwealth Rehabilitation Service in Western Australia operates the Melville Centre in South Street, O'Connor, which provides a wide range of assessment and treatment facilities for those who attend daily and for residents.

There is a medical block with resident nursing staff, visits by sessional consultants and a physiotherapy unit and gymnasium. An occupational therapy unit assesses aptitudes, skills and work tolerance.

Rehabilitation counsellors help clients select and achieve suitable vocational goals and also arrange training, in appropriate cases. Trainees receive a training allowance, books and equipment allowance and reimbursement of fares.

There is a school at the Centre for those clients who require remedial education or wish to upgrade their education.

Social workers are available to help with problems of a personal nature.

The following table shows, for Western Australia, the number accepted for rehabilitation, the number placed in employment and expenditure of the rehabilitation service over the six years 1975-76 to 1980-81.

REHABILITATION SERVICE — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number accepted for rehabilitation —						
Invalid pensioners	23	31	13	42	46	83
Unemployment and sickness beneficiaries	205	301	382	359	385	383
Other	42	86	178	155	216	237
Total	270	418	573	556	647	703
Number placed in employment —						
Invalid pensioners	14	16	9	18	22	24
Unemployment and sickness beneficiaries	110	131	183	131	157	134
Other	30	24	27	30	56	89
Total	154	171	219	179	235	247
Expenditure \$'000	1,171	1,225	1,453	1,694	1,974	2,365

Family Allowances

Family allowances are payable to persons having the care of children under sixteen years of age or student children aged sixteen years but under twenty-five years who are receiving full-time education at a school, college or university and are not in employment or engaged in work on their own account. (Family allowances were previously referred to as child endowment and student endowment.)

Family allowances are usually paid to the mother and to be eligible she must reside, or intend to reside, permanently in Australia and have the care of one or more children. Special

conditions apply if the person does not intend to reside permanently in Australia. Family allowances paid on behalf of student children are subject to an income test based on student income.

An approved institution is qualified to receive \$9.75 per week in respect of each child in its care.

FAMILY ALLOWANCES — WESTERN AUSTRALIA (a)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Endowed families at 30 June —						
Number of claims in force in respect of —						
Children under 16 years of age	165,731	176,870	180,009	180,008	r 183,254	186,075
Student children	17,700					
Number of endowed children —						
Children under 16 years of age	348,083	374,175	375,734	369,718	r 373,511	375,407
Student children	20,000					
Average number of endowed children per claim —						
Children under 16 years of age	2.10	2.12	2.09	2.05	2.04	2.02
Student children	1.13					
Approved institutions at 30 June —						
Number of endowed child inmates —						
Children under 16 years of age	4,915	2,171	1,811	1,597	r 1,502	1,706
Student children	151					
Amount paid during year (a) (b)	\$'000 (c) (d) 22,737	89,201	90,809	86,107	91,567	84,338

(a) Includes payments to institutions. (b) Prior to 15 June 1976 a number of endowments were paid every 12 weeks. During two years in every three, there were four such payments each year, and five in the third year. (c) Expenditure in this year includes five 12-weekly payments; see footnote (b). (d) New rates and conditions were effective from 15 June 1976.

Handicapped Child's Allowance

The handicapped child's allowance is payable to parents or guardians of a physically or mentally handicapped child under sixteen years or a student child aged sixteen years but under twenty-five years engaged in full-time study, who is cared for at home and is in need of constant care and attention. An allowance of \$73 per calendar month is payable free of income test in respect of a severely handicapped child. A rate of between \$20 and \$73 per calendar month, determined by the income level of the parent or guardian and the amount of special expenses incurred in caring for the child, is payable if the disability is classified as substantial but marginally less than severe.

Double Orphan's Pension

Conditions relating to payment of double orphan's pension are generally similar to those applying to family allowances. For the purposes of the Social Services Act a double orphan is a child aged under sixteen years, or a student child aged sixteen but under twenty-five years, both of whose parents are dead or one of whose parents is dead and the whereabouts of the other unknown to the claimant. The benefit extends also to a child whose only surviving parent is serving a prison sentence of not less than ten years or is a patient in a mental hospital or similar institution and is likely to remain so for an indefinite period. The pension, which is additional to family allowances, is paid at the rate of \$55.70 per calendar month and is not subject to an income test. It may be paid to a person, institution or authority and is to be applied to the maintenance, training and advancement of the child. The pension is not payable in the case of a child in respect of whom a war orphan's pension is being paid in terms of the Repatriation Act. The pension may also be payable on behalf of certain categories of refugee children who have been granted refugee status by the Australian Government.

Student Children

The *Social Services Act* 1973, which came into operation on 16 March 1973, defines a student child as being a person who is wholly or substantially dependent on a pensioner or beneficiary and who (a) has attained the age of sixteen years; (b) is receiving full-time education at a school, college or university; and (c) is not in receipt of an invalid pension'. Payments on account of student children which, prior to the operation of the Act, ceased when the student

reached the age of twenty-one years were thus extended without limitation in respect of age. This extension of benefit applies to student children of age, invalid and widow pensioners, of recipients of supporting parent's benefit, and of unemployment and sickness beneficiaries. However, the age limit of twenty-five years continues to apply to the payment of family allowances on account of student children.

Payment of Benefits outside Australia

Reciprocal arrangements in respect of payment of age and invalid pensions, widows' pensions, unemployment and sickness benefits and family allowances have been in force between the Governments of Australia and New Zealand since 1 July 1949 and between Australia and the United Kingdom since 7 January 1954.

The *Social Services Act* (No. 3) 1972 provided for the continued payment of a pension, subject to certain conditions, if a pensioner left Australia to reside in any other country with which appropriate reciprocal arrangements had been made. The *Social Services Act* (No. 2) 1973, which came into operation on 8 May 1973, repealed this provision and enabled age and invalid pensions (including wives' pensions) and widows' pensions, which were granted in Australia, to continue to be paid in any country where the pensioner may choose to live. A person receiving a supporting parent's benefit may continue to be paid the benefit outside Australia so long as he or she remains a supporting parent.

BENEFITS PAYABLE UNDER REPATRIATION ACT

Disability Pensions and Allowances

In general, disability pensions and associated benefits are payable to a veteran and/or his dependants where the veteran has died, or been incapacitated as a result of service in the 1914-1918 War, the 1939-1945 War, or certain subsequent operations of a war-like nature. In addition, members of the Regular Defence Force who have had at least three years' service terminating on or after 7 December 1972 (or a lesser period if discharged on medical grounds) may also be eligible for repatriation pensions if incapacity resulted from that service. Dependants of deceased servicemen may also qualify for benefit.

For veterans, basic eligibility varies according to the nature of service. Broadly, for those with 'active service', incapacity or death resulting from any occurrence during war service may be accepted. The criterion applying to 'home service' is more restricted, in that incapacity or death must have arisen out of, be attributable to, or have been aggravated by, that service.

Pensions in the categories available to veterans and their dependants (see below) are also payable to eligible members of the Regular Defence Force and their dependants.

Pensions for Veterans. Pensions are paid to eligible veterans in three main categories: the Special Rate (known as the T.P.I.) pension, payable to a veteran who, as a result of service, is blind, or is totally and permanently incapacitated so that he is unable to earn more than a negligible percentage of a living wage; the Intermediate Rate, payable to a veteran who, because of the severity of his incapacity accepted as related to service, can work only part-time or intermittently and, in consequence, cannot earn a living wage; and the General Rate, payable to a veteran who has an incapacity accepted as related to service but is not, because of that incapacity, prevented from being able to work full-time. General Rate pensions payable range from 10 per cent to 100 per cent of the maximum rate, according to the assessed degree of incapacity.

Pensions for Dependants. Dependants' pensions are paid to the wives of incapacitated veterans and to dependent children. Such persons are paid at rates varying with the assessed degree of the particular veteran's incapacity. When the death of a veteran has been accepted as related to his service, his widow qualifies for the war widow's rate of pension and for associated benefits, while his children receive pensions at 'orphan' rates and other benefits. If a veteran's death has not been accepted as related to service, but at the time of death he was receiving, or is later

adjudged to have been eligible to receive, a pension at the Special Rate (or one of certain other rates) his dependants qualify for pensions as if his death had been accepted as due to service.

Allowances. Several allowances are provided to supplement disability pensions. These allowances vary according to the type or severity of disablement and the special needs of the pensioner. They include attendant's allowance, loss of earnings allowance, recreation transport allowance and domestic allowance.

An education allowance is paid in respect of children of special rate pensioners and children of veterans who died as a result of service.

Attendant's allowance is paid at either of two rates to certain classes of severely disabled veterans, including the war-blinded, the paralysed and some double amputees. Loss of earnings allowance is payable to a veteran who has lost salary or wages because he has been undergoing medical treatment. The rate payable is equal to, or sufficient to bring any disability pension payable up to the Special Rate and is usually payable following treatment of service-related disabilities. However, under special circumstances it may also apply following treatment of non service-related disabilities. Recreation transport allowance may be paid at either of two rates for recreation purposes to certain classes of seriously disabled veterans. Domestic allowance is payable to a war widow in addition to her pension if she has attained the age of fifty years, or is permanently unemployable, or has a dependent child who is under the age of sixteen years or is undertaking approved full-time education or training and is not receiving an adequate living wage.

Amounts payable in respect of disability pensions and allowances between November 1979 and May 1982 are shown in the next table.

DISABILITY PENSIONS AND ALLOWANCES — RATES OF BENEFIT
(\$)

Pension or allowance	Rate current at —					
	November 1979	May 1980	November 1980	May 1981	November 1981	May 1982
	per week	per week	per week	per week	per week	per week
Disability pensions —						
Veterans —						
Special (I.P.I.) rate	110.90	116.90	122.75	127.65	133.50	142.05
Intermediate rate	76.35	80.45	84.45	87.85	91.90	97.80
General rate	41.85	44.10	46.30	48.15	50.35	53.55
Wife	4.05	4.05	4.05	4.05	4.05	4.05
Each dependent child	1.38	1.38	1.38	1.38	1.38	1.38
War widow	57.90	61.05	64.10	66.65	69.70	74.15
War orphan —						
Where father dead	12.50	12.50	13.80	13.80	15.00	15.00
Where both parents dead	25.00	25.00	27.60	27.60	30.00	30.00
Allowances —						
Payments for certain amputations and/or loss of vision	2.55 to 69.05	2.55 to 72.80	3.95 to 76.45	2.55 to 79.50	2.55 to 83.15	2.55 to 88.50
Attendant's allowance —						
Higher rate	35.00	35.00	38.65	38.65	42.04	42.04
Lower rate	17.50	17.50	19.33	19.33	21.02	21.02
Domestic allowance	12.00	12.00	12.00	12.00	12.00	12.00
Recreation transport allowance —	per month	per month	per month	per month	per month	per month
Higher rate	40.00	40.00	44.00	44.00	48.00	48.00
Lower rate	20.00	20.00	22.00	22.00	24.00	24.00

Particulars of disability pensions in Western Australia for the six years 1975-76 to 1980-81 are given in the following table.

DISABILITY PENSIONS — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of pensions current at 30 June —						
Incapacitated veterans	16,428	16,104	15,672	15,290	14,874	14,482
Dependants of incapacitated veterans	20,202	19,450	18,473	17,800	17,258	16,742
Dependants of deceased veterans	3,963	3,878	3,874	3,761	3,693	3,670
Miscellaneous (a)	26	27	34	32	32	26
Total	40,619	39,459	38,053	36,883	35,857	34,920
Amount paid in pensions during year (b) \$'000	23,118	25,587	28,728	28,183	29,098	33,411

(a) Pensions payable under Seamen's War Pensions and Allowances Act and 'Act of grace' pensions. (b) Includes widows' allowances.

Service Pensions and Allowances

A service pension is payable, subject to an income test similar to that applied to age and invalid pensions, to an Australian veteran who served in a theatre of war and who has attained the age of sixty years or is permanently unemployable. It is payable to a female veteran who served in a theatre of war or embarked for service abroad and has attained the age of fifty-five years or is permanently unemployable.

A service pension is therefore a broad equivalent of an age or invalid pension. The advantages to the recipient are the availability of pension five years earlier and access to a wide range of medical treatment services in the repatriation system. Service pensioners are eligible for the same range of pensions and allowances as age pensioners and the rates of benefit are the same.

Veterans of British Commonwealth Countries and Allied Countries have been eligible to receive a service pension since May 1975 and February 1980 respectively if they have resided continuously in Australia for at least ten years. Certain Australian mariners have also been eligible to receive a service pension since February 1982. Neither of the above however, have access to the medical treatment services in the repatriation system.

SERVICE PENSIONS — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of pensions current at 30 June —						
Veterans	9,377	10,308	11,127	12,030	13,208	14,460
Dependants of —						
Living service pensioners	3,619	4,548				
Deceased service pensioners	468	469	5,835	6,751	7,910	9,230
Act of grace pensioners	8	13	13	13	13	14
Total	13,472	15,338	16,975	18,794	21,131	23,704
Amount paid in pensions during year \$'000	20,560	26,933	33,785	38,896	45,911	59,328

Student Children

Prior to amendments made to the Repatriation Act in 1973, benefits and allowances payable in respect of student children, i.e. dependent persons receiving full-time education at a school, college or university, ceased when the student reached the age of twenty-one years. Subsequent amendments continue payment until the student reaches the age of twenty-five years.

Payment of Benefits outside Australia

The *Repatriation Act* (No. 2) 1973, which came into operation on 8 May 1973, authorises the payment of a service pension in any country in which the pensioner may choose to live. This provision had previously applied only to disability pensions.

DEPARTMENT FOR COMMUNITY WELFARE, WESTERN AUSTRALIA

The *Community Welfare Act 1972-1978* which came into operation on 1 July 1972, established the Department for Community Welfare. The *Child Welfare Act Amendment Act (No. 2) 1972* abolished the former Child Welfare Department and transferred its functions to the Department for Community Welfare. The *Aboriginal Affairs Planning Authority Act 1972* repealed the *Native Welfare Act 1963*. The welfare functions of the former Department of Native Welfare were transferred to the Department for Community Welfare with effect from 1 July 1972.

The functions of the Department for Community Welfare, as defined in the *Community Welfare Act 1972-1978*, are: '(a) to promote individual and family welfare in the community; (b) to prevent the disruption of the welfare of individuals and families in the community, and to mitigate the effects of any disruption; (c) to co-ordinate, assist and encourage the provision of social welfare services to the community, and for that purpose to confer and collaborate with other bodies and instrumentalities who offer, or may offer, a social welfare service; (d) to conduct, promote and encourage research into the problems of community welfare; (e) to conduct, promote and encourage programmes of training or rehabilitation, or which are otherwise of a nature that is concerned with the advancement of the welfare of particular individuals or groups in the community who are disadvantaged; (f) to consider and initiate, or to assist in, the provision and development of new or additional welfare services, whether of a general or specific nature, for individuals or groups within the community who are needy or disadvantaged; (g) to encourage the development of the greatest possible degree of service and administration at the local level, and to emphasise the value of preventive measures; (h) to provide assistance, where the Minister considers it to be necessary, when the welfare of any individual, family or group is threatened or in jeopardy; (i) to provide and, where appropriate, to manage facilities, which may include land, buildings and specialized appliances, for specific purposes consistent with the objects of this Act; (j) generally, to administer and give effect to the provisions of this Act and to carry out such other functions as may be prescribed, or as the Minister may direct.'

The Acts administered by the Director of the Department for Community Welfare, subject to any direction of the Minister, are the Community Welfare Act, the Child Welfare Act, the Welfare and Assistance Act, the Adoption of Children Act, and the Guardianship of Children Act.

STATE RELIEF PAYMENTS

Under the provisions of the *Welfare and Assistance Act 1961*, the State Government, through the Department for Community Welfare, extends financial assistance to indigent persons not immediately eligible for benefits paid by the Commonwealth Government under its social security programme. These relief payments are made primarily to ensure that single parent families without adequate income or support do not suffer financial hardship. Those assisted include separated wives or husbands, unmarried mothers, wives of prisoners and other special cases.

Other aid provided by the State for persons in need includes free travel for country people requiring medical treatment in the metropolitan area and a contribution towards the cost of high school uniforms for children of women receiving financial assistance. In certain circumstances, the burial of indigent persons is arranged at State expense.

Single parents applying to the Department for assistance are given advice concerning the legal redress available to them and it is usual for application to be made to the Family Law Court or a Children's Court for an order requiring the spouse or the father to provide maintenance. Court orders are enforceable throughout Australia and in certain overseas countries.

Under the *States Grants (Deserted Wives) Act 1968* the Commonwealth Government shares on a \$1 for \$1 basis with the States the cost of helping certain mothers of families without a

breadwinner where the mother is ineligible for a Class A widow's pension or the supporting parent's benefit. The main groups of mothers assisted are deserted wives, wives of prisoners, and unmarried mothers. Assistance is provided during the first six months after the birth of a child or the date of separation. After the first six months, a woman may qualify for either a Class A widow's pension or a supporting parent's benefit.

The grant by the Commonwealth Government to a State is equal to half the cost of the approved assistance paid by the State to each eligible person but may not exceed half the amount that would have been payable to such a person under the Social Services Act had she been eligible for a Class A widow's pension.

The Department for Community Welfare also provides non-continuous assistance to destitute persons in emergency circumstances or whilst awaiting payment of Commonwealth social security benefits.

The following table shows the maximum weekly rates of allowances and benefits paid in terms of the Welfare and Assistance Act and the Child Welfare Act.

**STATE GOVERNMENT RELIEF AND WELFARE PAYMENTS
MAXIMUM WEEKLY RATES
(\$)**

Allowance or benefit	Rate current at —					
	November 1978	November 1979	May 1980	November 1980	May 1981	November 1981
Parent not receiving Commonwealth Government assistance	53.20	57.90	61.05	64.10	66.65	69.70
Additional payments in respect of dependent children —						
First child	11.50	11.50	11.50	16.00	16.00	16.00
Second and each subsequent child	7.50	7.50	7.50	10.00	10.00	10.00
Supplementary allowances —						
Child aged under 6 years or invalid child aged under 16 years	2.00	2.00	2.00	2.00	2.00	2.00
Rent allowance	5.00	5.00	5.00	5.00	5.00	5.00
Wards of the State —						
Foster children in families —						
Each child	18.75	20.25	20.25	22.25	22.25	24.00
Additional payment for each high school child	3.25	3.50	3.50	3.75	3.75	4.00
In institutions —						
Each child	20.25	21.75	21.75	24.00	24.00	26.00
Additional payment for each high school child	3.50	3.75	3.75	4.00	4.00	6.00
Allowance for each high school child (a) —						
At first year level	2.00	2.00	2.00	2.00	2.00	2.50
At second year level	2.00	2.00	2.00	2.00	2.00	2.50
At third year level	2.00	2.00	2.00	2.00	2.00	2.50
At fourth and fifth year levels	3.00	3.00	3.00	3.00	3.00	4.00
Foster child (b) —						
In institution	20.25	21.75	21.75	24.00	24.00	26.00
In private home	18.75	20.25	20.25	22.25	22.25	24.00

(a) Applies to all wards, whether accommodated in institutions or living as foster children in families. (b) Foster child not being a ward of the State. Separate rates for foster children in institutions or private homes have applied from October 1978.

STATE GOVERNMENT FINANCIAL ASSISTANCE TO FAMILIES

Particulars	Number of new applications received					
	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Separated wives	3,372	3,856	4,366	4,795	4,646	(a)
Wives of prisoners	264	234	203	201	207	(a)
Emergency assistance (including husband sick or unemployed)	9,867	9,710	14,218	13,221	8,646	12,895
Unmarried mothers	644	623	692	686	687	(a)
Separated husbands	53	64	95	94	89	(a)
Travel	976	755	1,096	1,417	1,061	1,187
Other	28	121	102	23	7	1,895
Total applications	15,204	15,363	20,772	20,437	15,343	15,977

(a) The Department of Social Security assumed responsibility from November 1980.

CHILD WELFARE

Under the provisions of the *Child Welfare Act 1947-1981* the State Government, through the Department for Community Welfare, is responsible for the care of wards and children placed under control and supervision or released on probation by Children's Courts. For the purposes of the Act, a child is defined as 'any boy or girl under the age of eighteen years'. Fit and proper persons may be licensed to care for children and are subject to supervision by the Department. Other functions of the Department are the arranging of legal adoptions and the control of children employed in street trading and in public entertainment. A provision of the Child Welfare Act vests in the Department the right to decide which centre or facility or what form of treatment is appropriate to the needs of a child committed by a Children's Court to the care of the Department for treatment, discipline and training.

Children's Courts established at Perth, Fremantle, Midland and Rockingham, and at most country towns throughout the State have jurisdiction in all cases where children under eighteen years of age are involved whether as offenders or as being in need of care and protection. The Courts also have jurisdiction to deal with adults committing certain specified offences against children. The public may be excluded from Court hearings and names of juvenile offenders are withheld from publication unless with the express authority of the Court. Adults charged with certain indictable offences against children may forgo the right to trial by jury and agree to be dealt with summarily by Children's Courts. This power to exercise summary jurisdiction is designed to eliminate as far as possible the necessity for children to appear in open courts as witnesses in cases dealing with sex offences. A Children's Court may commit such offenders for sentence by the Supreme Court of Western Australia or the District Court of Western Australia.

Children guilty of minor offences may be cautioned, fined, placed on probation, or the charge may be dismissed without a conviction being recorded. A Court may declare a child to be in need of care and protection and may order the child to be committed to the care of the Department for Community Welfare, placed under the control of the Department, or released on probation. Children found guilty of offences punishable by imprisonment may be dealt with in a similar manner. Those guilty of less serious or first offences are generally placed in the care of their parents or suitable guardians under appropriate supervision by officers of the Department for Community Welfare. Children aged seven to fifteen years who admit a less-serious first offence may be dealt with by a Panel instead of appearing before a Children's Court. Panels are made up of an authorised officer of the Department and a senior or retired police officer. They may suspend action against children for up to six months. No conviction is recorded if the children do not re-offend in that period. Children who commit a second offence, or whose conduct is unsatisfactory during the period of suspended action, appear before a Children's Court on the original and subsequent charges. Parents are required to attend with their children. Further reference to Children's Courts appears in the section *Law Courts* in Part 5 of this Chapter.

Supervision of Children. A child committed to the care of the Department for Community Welfare or to the custody of the Director of the Department for Community Welfare becomes a ward of the Department. A ward may be placed in a Departmental centre or facility, boarded out with a relative or other approved person, paroled or placed in suitable employment. Where a child is placed under the control of the Department for Community Welfare, the child's parents retain guardianship functions and responsibilities. The Director of the Department for Community Welfare has authority to place wards of working age in employment or apprenticeship. The *Immigration (Guardianship of Children) Act 1946* (Commonwealth) provides that the Minister for Immigration shall be the guardian of migrant children under the age of twenty-one years who are not in the care of a parent or other relative. In Western Australia this function is exercised, under delegation, by the Director of the Department for Community Welfare.

Departmental Expenditure. The following table gives details of annual expenditure of the Department for Community Welfare during the six-year period ended 30 June 1981.

DEPARTMENTAL EXPENDITURE
(\$'000)

Nature of expenditure	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Administration	2,057	2,473	2,747	3,673	4,325	4,871
Field services	4,690	5,640	6,631	7,110	8,113	9,068
Departmental institutions	6,178	7,033	7,948	8,048	9,002	10,433
Maintenance of children	2,803	2,970	2,969	2,998	3,149	3,404
Adoption of children	54	20	(a)	(a)	(a)	(a)
Financial assistance (b)	2,098	2,623	6,127	6,682	7,087	3,164
Unemployment relief	131	166	282	247	(c)	(c)
Community Welfare assistance	680	896	969	1,249	1,483	1,716
Reserves (Aboriginal housing)	322	1,079	1,061	453	376	434
Residential Child Care	—	—	1,246	1,528	1,657	—
Total expenditure	19,012	22,901	29,981	31,988	35,192	33,090
Total revenue	1,640	2,058	5,274	4,627	5,386	4,460
Net expenditure	17,372	20,843	24,707	27,361	29,806	28,630

(a) Included under *Maintenance of children*. (b) Assistance to women with dependent children and to the infirm.
(c) Transferred to the Commonwealth Department of Social Security from April 1979.

Maintenance of Children. The Department for Community Welfare makes payments at the rates shown in the table in the section, *State Relief Payments* to foster parents and institutions having State wards in their care. The British Government pays \$2.50 per week for each British migrant child in an institution or boarded out and the State Government pays an additional amount of 60 cents per week for the first twelve months after arrival. A further grant of one dollar per week for each child maintained is paid to the institutions by the State Lotteries Commission. Where an institution refuses assistance from the Commission on religious or moral grounds the State Government may grant an equivalent allowance to the institution for each ward maintained. All institutions and foster parents having the care of children receive Commonwealth family allowances.

Parents or step-parents are required to contribute towards the maintenance of wards in institutions or boarded out.

Day Care Centres. Any person who provides day-to-day care of children under the age of six years must have a licence issued by the Department for Community Welfare in accordance with regulations which specify standards relating to premises, furnishings, equipment, staffing and the general conduct of centres. An advisory service is provided by the Department to assist those wishing to establish centres, and to ensure that the regulations are observed and that good standards of child care are maintained.

The Commonwealth Government, under the provisions of the *Child Care Act* 1972, provides financial assistance to certain non-profit organisations for the establishment and operation of child care centres primarily for the children of working or sick parents or of parents who for other reasons are unable to care for them during the day. Capital grants are payable to eligible organisations for the purchase, erection, extension or alteration of buildings (including land cost) for use as a child care centre. Recurrent grants are payable to encourage the employment of qualified staff and to enable the centres to offer reduced fees in respect of children from families in financial need. The Act also provides for grants to be made available to suitable bodies for research and evaluation of matters relating to child care.

Institutions. The State Government subsidises homes for children in Western Australia. Most of these centres and facilities are conducted by religious organisations. All institutions having the care of wards (including migrant children) or private children under six years of age are subject to the supervision of the Department for Community Welfare.

CHILDREN IN DEPARTMENTAL INSTITUTIONS

Institution	At 30 June —					
	1976	1977	1978	1979	1980	1981
Bridgewater Care and Assessment Centre, Applecross	32	64	72	91	72	59
Hillston Farm School, Stoneville	69	62	27	42	33	44
Longmore Remand and Assessment Centre, Bentley	97	60	63	62	73	64
McCall Treatment Centre, Cottesloe	11	14	17	14	12	13
Nyandi, Bentley	40	11	16	16	14	23
Riverbank, Caversham	32	24	21	36	43	46
Walcott, Mount Lawley	50	20	28	20	31	31
Total	331	255	244	281	278	280

Departmental institutions provide short-term accommodation for children in need of care and children awaiting proceedings in Children's Courts; assessment facilities for children coming into the care of the Department; treatment centres of a secure nature; and hostel accommodation. Children aged from three years to eighteen years are provided for. Wards under three years of age requiring short-term care are placed by arrangement at Ngal-a Mothercraft Home and Training Centre, South Perth.

Adoption of Children. All children eligible for adoption in Western Australia come under the guardianship of the Director of the Department for Community Welfare. A person wishing to adopt a child may apply direct to the Department or through a solicitor. Each applicant must be assessed by the Department for suitability, and an order for the legalisation of an adoption must be obtained from a Judge of the Family Court of Western Australia.

Employment of Children. The *Child Welfare Act 1947-1981* provides the conditions under which children may engage in street trading. Male children under twelve and female children under school leaving age are not permitted to engage in street trading.

The Department is authorised under the Act to carry out any investigations necessary, relative to children engaged in public performances and ensuring their safety and welfare.

Part 5 — Law, Order and Public Safety

The law in force in Western Australia is contained in The Statutes of Western Australia, comprising legislation passed by the Western Australian Parliament and certain Imperial Acts which have been adopted, and in the Commonwealth Acts in so far as they apply to Western Australia. Under the Constitution of the Commonwealth of Australia, 'when a law of a State is inconsistent with a law of the Commonwealth, the latter shall prevail, and the former shall, to the extent of the inconsistency, be invalid'.

The Legal Profession

The Barristers' Board, constituted under the *Legal Practitioners Act 1893-1981*, comprises the Attorney-General as chairman; the Solicitor-General; all Queen's Counsel permanently residing and practising in the State; and seven practitioners of at least three years' standing and practice in the State, elected annually by the practitioners on the roll of the Supreme Court residing and practising in the State.

The Board has the power to regulate and control the examination and admission of articulated clerks, and the examination of all candidates for admission as practitioners. The certificate of the Board is necessary before any person may be admitted to practice. An applicant for admission having qualifications acquired outside Western Australia must satisfy the Board that he possesses qualifications substantially equivalent to those required for the admission of persons who qualify in Western Australia.

Crown Law Department

The Crown Law Department is administered, subject to the control of the Attorney-General, by the Under Secretary for Law. The Department is responsible for the Supreme Court Central Office, the District Court Registry, the Family Court Registry, Court Offices throughout the State (except Children's Courts), the Crown Solicitor's Office, the Office of Titles, the Public Trust Office, the Corporate Affairs Office, and the Probation and Parole Service. The Department, in addition to administering the Acts which come under the portfolio of the Attorney-General, conducts Crown legal business and, when required, acts for and advises all other State Government Departments and instrumentalities.

Law Reform Commission of Western Australia

The Law Reform Commission of Western Australia was established by the *Law Reform Commission Act 1972-1978* which came into force on 19 January 1973. The Commission has five members, two full-time members and three part-time members. The full-time members must be or have been legal practitioners in Australia for at least eight years or have other suitable legal qualifications and experience. Of the part-time members one must be a legal practitioner practising as such in Western Australia; one must be engaged in teaching law at a University in Western Australia; and one must be a legal officer of the Western Australian Crown Law Department.

The Commission examines proposals for review of aspects of the law referred to it by the Attorney-General. It may also submit to the Attorney-General proposals for review. The Commission usually issues a working paper discussing the issues involved in a particular proposal under consideration and invites comments from interested persons. A report is then made to the Attorney-General.

During the year ended 30 June 1981 the Commission submitted reports on: Admissibility in Evidence of Computer Records and other Documentary Statements; Unclaimed Money; Liability

of Highway Authorities for Non-Feasance; and Liability for Stock Straying on to the Highway. In addition working papers were issued on: Liability for Stock Straying on to the Highway; Absconding Debtors Act; Recognition of Interstate and Foreign Grants of Probate and Letters of Administration; and Judicial Review of Administrative Decisions. The Commission also published the Record and Minutes of the Fourth and Fifth Australian Law Reform Agencies Conferences.

Parliamentary Commissioner for Administrative Investigations

The *Parliamentary Commissioner Act 1971-1976*, which came into operation on 12 May 1972, provides for the appointment of a Parliamentary Commissioner for Administrative Investigations with the powers of a Royal Commission as specified in the *Royal Commissions Act 1968*. The first Commissioner was appointed on 24 April 1972.

The Commissioner (commonly known as the ombudsman) is empowered to investigate administrative actions taken by or on behalf of certain government authorities. The Act applies to all Departments of the Public Service, excluding officers of the establishment of the Governor and of the Agent General for Western Australia (London), to all local government authorities, and to other specified authorities. It does not apply to the Supreme Court of Western Australia, The District Court of Western Australia, other courts of law in the State, a Judge of the Supreme Court or of the District Court, a commissioner of any court, a stipendiary magistrate, a coroner, the Auditor-General, the Parliamentary Privileges Act, or any decision of the Cabinet or of a Minister of the Crown.

LAW COURTS

The principal courts operating in Western Australia are the High Court of Australia, the Supreme Court of Western Australia, The District Court of Western Australia, the Family Court of Western Australia, the Magistrates' and Coroners' Courts and the Licensing Court of Western Australia. In Chapter X, Part 1, reference is made to the Federal Court of Australia, the Australian Conciliation and Arbitration Commission, the Western Australian Industrial Appeal Court, and The Western Australian Industrial Commission.

High Court of Australia

The High Court of Australia is the Federal Supreme Court and its powers are defined in the Commonwealth of Australia Constitution Act and in the *Judiciary Act 1903*. The High Court consists of a Chief Justice and six other Justices. Sittings are held in the capital city of each State as occasion may require. The High Court exercises both original and appellate jurisdiction, acting as a court of appeal for Australia.

An appeal may lie from a judgment of the High Court of Australia to the Judicial Committee of the Privy Council in London. However, the *Privy Council (Limitation of Appeals) Act 1968* (Commonwealth) limits the matters which may be the subject of special leave of appeal from a decision of the High Court. The Act provides, in part, that leave of appeal 'may be asked only in a matter in which the decision of the High Court was a decision that (a) was given on appeal from a decision of the Supreme Court of a State given otherwise than in the exercise of federal jurisdiction; and (b) did not involve the application or interpretation' of the Commonwealth Constitution, or of a Commonwealth law (including any ordinance, rule, regulation or by-law made under such a law).

Supreme Court of Western Australia

The Supreme Court of Western Australia, as constituted under the *Supreme Court Act 1935-1982*, consists of a Chief Justice and such other Judges, not exceeding six in number, as may from time to time be appointed. The jurisdiction of the Court in both civil and criminal matters is exercised by a single Judge, sitting alone or with a jury, unless it is provided that an action must be brought before a Full Court. Criminal cases are heard before a jury. Criminal sittings of the Supreme Court are held at Perth each month from February to December, and also in January if the Chief Justice so directs. Civil sittings and Full Court sittings are held at times

fixed by the Court from year to year. There are regular sittings at Albany, Bunbury, Geraldton and Kalgoorlie, and at other country centres as required.

Any two or more Judges together comprise a Full Court except that when sitting as a court of criminal appeal there must be an uneven number of Judges. Appeals are heard against judgments of the Supreme Court and the District Court as well as against decisions of the magistrates in the Courts of Petty Sessions.

Appeal from a judgment of the Supreme Court of Western Australia lies to the High Court of Australia, subject to the provisions of the *Judiciary Act 1903* (Commonwealth), and may also be made direct to the Privy Council.

The District Court of Western Australia

The District Court of Western Australia is constituted under the provisions of the *District Court of Western Australia Act 1969-1982* and consists of a Chairman of Judges and such other Judges as may from time to time be appointed. The Act, which came into operation on 1 April 1970, repealed the *Courts of Session Act 1921*. The jurisdiction of the Court is exercised by a Judge sitting alone or with a jury. Criminal cases must be heard before a Judge and jury. Criminal sittings of the District Court are held at Perth each month from January to December, five times a year at Albany, Bunbury, Geraldton and Kalgoorlie, and at other centres when required. Civil sittings are held concurrently with criminal sittings in Perth, and immediately following the criminal sittings at other centres except at Bunbury where special civil sittings are held four times a year.

Civil jurisdiction exists broadly up to a maximum of \$50,000, and criminal jurisdiction in respect of indictable offences except those for which the maximum penalty exceeds fourteen years' imprisonment.

Appeals from a District Court Judge lie, in the civil jurisdiction, to the Full Court of the Supreme Court and, in the criminal jurisdiction, to the Court of Criminal Appeal.

Family Court of Western Australia

The Family Court of Western Australia which came into operation on 1 June 1976 is constituted under the provisions of the *Family Court Act 1975-1982*. The Court consists of a Chairman of Judges and such other Judges as may from time to time be appointed. The jurisdiction of the Court is exercisable by one Judge.

The Court has throughout the State the federal jurisdiction with which it is invested by the *Family Law Act 1975* (Commonwealth) and non-federal jurisdiction conferred on it by, or under any Act of the State.

Appeals in respect of federal jurisdiction matters lie to the Full Court of the Family Court of Australia; and appeals in respect of non-federal jurisdiction matters lie to the Full Court of the Supreme Court of Western Australia.

Magistrates' and Coroners' Courts

In addition to their usual functions, magistrates act as coroners and mining wardens where required. Two or more Justices of the Peace sitting together in petty sessions may deal with cases which could be decided by a magistrate sitting alone.

COURTS OF PETTY SESSIONS. Courts of Petty Sessions, which are established in terms of the *Justices Act 1902-1981*, are held at centres of population throughout the State. Minor offences are dealt with summarily, but a person charged with an indictable offence may be committed to a higher court for trial or sentence if there is sufficient evidence to justify this course.

CHILDREN'S COURTS. The *Child Welfare Act 1947-1981* provides for the establishment of Children's Courts, and the appointment of special magistrates, to deal with offenders under the age of eighteen years and to hear certain specified cases of offences against children. Certain cases of offences concerning children may be remanded for hearing or committed for sentence

before the Supreme Court. The public may be excluded from Children's Court hearings and names of juvenile offenders are withheld from publication unless with the express authority of the Court. Children's Courts operate in Perth, and at other centres as required. Further reference to Children's Courts appears in the section *Child Welfare* in Part 4 of this Chapter.

LOCAL COURTS. Local Courts, which are established in terms of the *Local Courts Act 1904-1981*, are held throughout the State to determine minor civil issues, largely the recovery of small debts. Jurisdiction is limited in most cases to claims not exceeding \$6,000.

CORONERS' COURTS. The powers of coroners are derived from the *Coroners Act 1920-1979*. Coroners' Courts may be held to inquire into the circumstances of sudden, unnatural and suspected deaths or the cause and origin of fires. A coroner may charge a person with a major offence and commit him for trial at a higher court.

Licensing Court of Western Australia

The Licensing Court of Western Australia is established under the provisions of the *Liquor Act 1970-1981*. The Court comprises three members, including a chairman, appointed by the Governor. Except as otherwise provided by the Act, the Court may be constituted, and its jurisdiction may be exercised, by any two members. The Court has exclusive jurisdiction to hear and determine all applications under the Liquor Act in respect of licences, provisional certificates and permits relating to the sale, supply and consumption of liquor. Appeal against a direction, determination or order of the Court lies to the Supreme Court, but only where the appeal involves a question of law.

Small Claims Tribunals

The *Small Claims Tribunals Act 1974-1981* provides for the establishment of Small Claims Tribunals and the appointment of referees to deal with claims involving an amount less than \$1,000. A Tribunal is constituted by a referee sitting alone and may be constituted at any place in the State. Settlements or orders made by a referee are final and binding on all parties to a proceeding.

COURT PROCEEDINGS

Higher Courts

The term *Higher Courts* refers to courts presided over by a Judge. The general jurisdiction of the higher courts includes appeals from the lower courts, cases of crime committed from lower courts, and civil cases. Under the *Bankruptcy Act 1966* (Commonwealth) the Supreme Court of Western Australia is invested with jurisdiction in bankruptcy. Prior to the constitution of the Family Court of Western Australia which came into operation on 1 June 1976 the Supreme Court was also vested with jurisdiction in divorce and related matters under the *Matrimonial Causes Act 1959* (Commonwealth) and the *Family Law Act 1975* (Commonwealth).

Civil Proceedings

Particulars of civil cases, with the exception of bankruptcy cases, dealt with by the courts in the six years ended 31 December 1981 are shown in the following table.

COURTS — CIVIL PROCEEDINGS

Particulars	1976	1977	1978	1979	1980	1981
SUPREME COURT OF WESTERN AUSTRALIA —						
Actions —						
Writs of summons issued	1,401	891	944	1,027	1,308	1,618
Actions listed for trial	182	202	197	184	225	188
Actions settled without trial	62	82	80	80	90	59
Actions heard	75	117	120	104	135	129
Other originating processes —						
Originating summons	296	296	288	270	284	328
Petitions —						
In bankruptcy (creditors)	25	23	41	48	45	78
Companies Act	30	58	111	97	154	111

COURTS — CIVIL PROCEEDINGS — *continued*

Particulars	1976	1977	1978	1979	1980	1981
SUPREME COURT OF WESTERN AUSTRALIA — <i>continued</i>						
Judgments made	312	284	251	267	336	346
Divorce (a) —						
Number of —						
Decrees granted	1,774	203	55	(b)	(b)	(b)
THE DISTRICT COURT OF WESTERN AUSTRALIA (c) —						
Number of —						
Writs commencing actions	4,664	2,719	3,663	4,097	4,865	5,377
Judgments —						
With trial	126	190	114	167	207	291
Without trial	2,222	2,147	1,486	1,771	2,197	2,464
Amounts awarded \$'000	9,871	11,140	12,701	17,109	20,905	n.y.a.
FAMILY COURT OF WESTERN AUSTRALIA (b) —						
Dissolution of marriage —						
Number of —						
Applications filed	2,634	3,950	3,485	3,269	3,363	3,937
Decrees made	2,861	3,761	3,327	3,397	3,073	3,481
LOCAL COURTS —						
Number of —						
Plaints entered	56,542	56,182	65,791	72,642	77,227	70,520
Verdicts for plaintiffs	19,839	19,443	23,128	26,213	28,080	23,922
Amounts awarded \$'000	4,191	6,378	9,857	13,780	16,084	14,783
CORONERS' COURTS —						
Number of —						
Inquests	251	187	160	151	n.a.	183
Inquiries	n.a.	1,912	1,806	1,899	n.a.	2,025

(a) Figures relate to petitions and decrees for dissolution of marriage, nullity of marriage, and judicial separation. (b) The Family Court commenced operation on 1 June 1976. (c) Figures relate to Principal Registry at Perth only.

CONVICTIONS IN COURTS

Number of Convictions

It is important to bear in mind when considering the particulars shown in the following tables that the figures relate to the *number of convictions* recorded and not to the *number of persons* convicted. Thus, where a person is convicted on more than one count each conviction so recorded has been included in the statistics.

COURT STATISTICS — NUMBER OF CONVICTIONS: 1981

ANCO code (a)	Description	Supreme and District Courts	Courts of Petty Sessions	Childrens Courts	Total
100	Offences against the person —				
111	Murder	8	—	—	8
112	Attempted murder	5	—	—	5
113	Conspiracy to murder	—	—	—	—
114	Manslaughter (excluding by driving)	8	—	—	8
115	Driving causing death	8	15	3	26
121	Assault occasioning grievous bodily harm	66	33	9	108
122	Assault occasioning actual bodily harm	21	331	62	414
123	Other assault	22	1,652	364	2,038
131	Rape	50	5	—	55
132	Carnal knowledge	2	9	70	81
133	Incest	2	—	—	2
134	Indecent assault	20	16	45	81
135	Other sexual offences	23	26	32	81
141	Kidnapping and abduction	6	—	1	7
142	Ill-treatment of children	20	—	4	24
143	Other offences against the person (including acts of endangering life) n.e.i.	2	4	11	17
	Total	263	2,091	601	2,955
200	Robbery and extortion —				
211	Armed robbery	57	5	6	68
212	Other robbery	27	1	—	28
221	Extortion	3	—	—	3
	Total	87	6	6	99

COURT STATISTICS — NUMBER OF CONVICTIONS: 1981 — *continued*

ANCO Code (a)	Description	Supreme and District Courts	Courts of Petty Sessions	Childrens Courts	Total
300	Breaking and entering, fraud, and other offences involving theft —				
311	Breaking and entering — dwellings	381			
312	Breaking and entering — shops	66	1.430	3.278	5.308
313	Breaking and entering — other buildings	153			
321	Fraud, forgery and false pretences	236	3.038	410	3.684
322	Misappropriation	—	10	7	17
331	Receiving	25	(b)	(b)	(b)
332	Unlawful possession of stolen goods	19	(b)	(b)	(b)
341	Motor vehicle theft	96	683	1.380	2.159
342	Stealing from the person	5	(b)	(b)	(b)
343	Shoplifting	(b)	(b)	(b)	(b)
344	Other theft	195	(b) 4.821	(b) 3.111	(b) 8.176
	Total	1.176	9.982	8.186	19.344
400	Property damage and environmental offences —				
411	Arson (person not therein)	14	5	23	42
412	Other property damage	27	1.437	670	2.134
421	Pollution	—	5	—	5
422	Other environmental offences	—	81	6	87
	Total	41	1.528	699	2.268
500	Offences against good order —				
511	Offences against Government security and operations	5	9	4	18
521	Breach of maintenance order	—	4	2	6
522	Offences against enforcement of order	34	2.358	333	2.725
531	Prostitution and related offences	—	78	2	80
541	Offences involving drunkenness	—	13.234	456	13.690
542	Other offensive behaviour	2	4.258	595	4.855
551	Unlawful possession of weapons	7	948	113	1.068
561	Liquor and licensing offences	—	2.977	373	3.350
562	Betting and gaming offences	—	487	48	535
563	Trespassing and vagrancy	—	603	284	887
564	Consorting	—	1	1	2
565	Other offences against good order	—	2.060	281	2.341
	Total	48	27.017	2.492	29.557
600	Drug offences —				
611	Possession/use of narcotics	10	22	1	33
612	Possession/use of cannabis/marihuana	75	1.291	86	1.452
613	Possession/use of other drugs	5	66	12	83
621	Dealing and trafficking in drugs	53	13	—	66
631	Manufacturing/growing drugs	—	219	8	227
632	Other drug offences	—	33	3	36
	Total	143	1.644	110	1.897
700	Motor vehicle, traffic and related offences —				
711	Driving under influence of alcohol or drugs	—	10.036	354	10.390
712	Dangerous, reckless, negligent driving (excluding driving causing death or bodily harm)	—	2.209	526	2.735
713	Other offences involving the driving of a vehicle	—	13.001	974	13.975
721	Licence offences	1	6.767	1.800	8.568
722	Registration/insurance offences	—	2.769	219	2.988
723	Roadworthiness and other administrative offences	—	1.538	202	1.740
731	Other motor vehicle, traffic and related offences	—	13.876	1.147	15.023
	Total	1	50.196	5.222	55.419
800	Other offences —				
811	Other offences	—	6.928	222	7.150
900	Child welfare matters	n.a.	n.a.	n.a.	n.a.
	GRAND TOTAL	1.759	99.392	17.538	118.689

(a) Relates to *Australian National Classification of Offences*, ABS Canberra, June 1980. (b) Offence category 'Other theft' (Code 344) includes convictions for *Receiving*, *Unlawful possession of stolen goods*, *Stealing from the person* and *Shoplifting*.

Regulations under the Traffic Act (now repealed) allowed fines to be imposed without court action for minor traffic offences. These provisions are continued under the *Road Traffic Act*

1974-1981. Similar provisions apply under parking facilities legislation and municipal by-laws. These minor offences (which are, of course, excluded from the tables relating to court convictions) numbered 315,953 in 1976, 306,885 in 1977, 307,396 in 1978, 333,545 in 1979, 335,241 in 1980 and 348,452 in 1981.

LIQUOR LICENCES

The following table shows the number of liquor licences of the several types in force in Western Australia under the provisions of the *Liquor Act 1970-1981*.

LIQUOR LICENCES IN FORCE

Type of licence (a)	At 30 June —					
	1976	1977	1978	1979	1980	1981
Australian wine	20	15	13	8	6	6
Brewer's	4	4	5	5	4	2
Cabaret	27	27	28	32	35	36
Canteen	30	33	34	32	33	38
Club	296	307	313	316	321	323
Historic inn	—	—	—	—	—	1
Hotel	400	386	383	383	381	380
Limited hotel	24	25	25	24	26	26
Packet	11	11	14	20	21	22
Restaurant	109	117	134	156	168	201
Store	300	316	325	328	330	333
Tavern	131	158	170	175	184	187
Theatre	3	3	4	5	5	5
Vigneron's	—	—	—	2	4	5
Wholesale	59	58	65	69	73	74
Winehouse	15	13	12	12	15	16
Total	1,429	1,473	1,525	1,567	1,606	1,655

(a) As described in the *Liquor Act 1970-1981*.

By a provision of the *Government Railways Act 1904-1980*, The Western Australian Government Railways Commission is authorised to lease railways premises for the sale of refreshments, subject to the provisions of the *Liquor Act 1970-1981*.

A licence applying to premises at Perth International Airport is issued in terms of the *Airports (Business Concessions) Act 1959* (Commonwealth).

POLICE

The Western Australian Police Force comprises five main branches under the direction of the Commissioner of Police. The Commissioner is appointed by the Governor under the provisions of the *Police Act 1892-1981* and is responsible to the Minister for Police.

For the administration of the Uniformed Branch, the State is divided into three metropolitan regions, five metropolitan divisions and eight country regions, each under the direction of a commissioned officer. At 30 June 1981 there were, in addition to the Uniformed Branch, a number of specialised branches and sections, including the Criminal Investigation Branch, 79 Division, the Liquor and Gaming Branch, the Firearms Branch, the Traffic Patrol, the Prosecuting Branch, the Public Relations, Crime Prevention and Lecturing Branch, the Communications Branch, the Scientific Branch, the Training Branch, the Recruiting Branch, the Planning and Research Section, the Electronic Data Processing Section, and Police and Citizens' Youth Clubs.

The Uniformed Branch comprises the main body of the Police Force and is responsible for the routine maintenance of law and order throughout the State. Where required, officers of the Branch act as Clerks of Courts and perform special duties for other government authorities.

Women in the Police Force participate in all facets of police duties. At 30 June 1981 seventy-four women police officers were employed.

POLICE FORCE — NUMBER AND CLASSIFICATION (a)

Date of classification	Branch and number of officers							Total (a)
	General Uniformed Branch	Women Police	Criminal Investigation Branch	Liquor and Gaming Branch	Firearms Branch	Traffic Patrol	Other Branches	
At 30 June —								
1976	1,252	35	239	45	17	503	191	2,282
1977	1,265	33	283	46	12	491	209	2,339
1978	1,284	(b)	335	48	11	543	263	2,484
1979	1,316	(b)	355	48	13	548	272	2,552
1980	1,331	(b)	380	51	12	572	291	2,637
1981 —								
Superintendent	17		4	1	1	5	6	34
Senior Inspector	14		4	—	—	8	7	33
Inspector	16	(b)	5	1	—	9	6	37
Sergeant	281		129	6	5	111	90	622
Constable	1,027		216	43	6	442	190	1,924
Total	1,355	..	358	51	12	575	299	2,650

(a) In addition to the numbers shown there were, at 30 June 1976 to 1978 a Commissioner of Police, a Senior Assistant Commissioner, three Assistant Commissioners, and a Chief Superintendent; at 30 June 1979 and 1980 a Commissioner of Police, a Senior Assistant Commissioner and four Assistant Commissioners; and from 15 July 1981 a Commissioner of Police, a Senior Assistant Commissioner, four Assistant Commissioners, a Senior Chief Superintendent and three Chief Superintendents. (b) The Women Police ceased operation as a separate branch on 8 August 1977.

The Criminal Investigation Branch is centred in Perth, with several sub-branches in the metropolitan area and the principal country towns. The Branch is primarily concerned with the investigation of serious crimes and the apprehension of offenders.

The 79 Division is a combined squad of detectives and general uniformed staff, formed to provide a patrol service capable of attending complaints of any nature within the Perth Region.

The Commercial Agents Squad investigates matters relating to land agents, auctioneers, money-lenders, inquiry agents, employment brokers, debt collectors, security agents and guards, installers and technicians of intruder alarm systems and security devices. This squad is comprised of plain-clothes and uniformed general duties officers attached to the Criminal Investigation Branch.

The Communications Branch is responsible for the police radio-communications network and provides a vital link with available data base information.

The Scientific Branch is responsible for matters relating to fingerprint, photography, video, criminal records, Central Warrant Bureau, ballistics, hazardous devices, handwriting and document examination and various technical and scientific aids to investigation.

The Liquor and Gaming Branch is concerned mainly with the enforcement of the liquor laws and laws for the suppression of gaming and distribution of pornographic literature and articles.

The Firearms Branch is responsible for the licensing of firearms throughout the State.

The Police Department and the Road Traffic Authority were amalgamated on 2 February 1982. The Traffic Patrol has been renamed the Police Traffic Branch and is responsible for enforcement of the traffic laws in the metropolitan and near metropolitan areas.

The Planning and Research Section surveys and assesses present and future police requirements, equitable and effective distribution of resources, land, buildings and housing requirements.

The Prosecuting Branch conducts police prosecutions in Childrens Courts and Courts of Petty Sessions in the metropolitan area, at Bunbury, Geraldton, Kalgoorlie and Port Hedland and, when required, at other centres.

The Public Relations, Crime Prevention and Lecturing Branch is responsible for maintaining a satisfactory relationship with the public and the news media. Lectures are given to children and students from early childhood to tertiary education level and also to minor offenders against the traffic and liquor laws, as well as appraisals and advice to the public on matters of home and business security.

Police and Citizens' Youth Clubs are established by the Police Department to provide recreational facilities for young people and to give them an appreciation of civic responsibilities.

PRISONS

Under the provisions of the *Prisons Act 1903-1981*, the Director of the Department of Corrections is responsible, subject to the control of the Minister, for the administration of prisons in Western Australia. In addition there is a police gaol at East Perth administered jointly by the Department of Corrections and the Police Department.

The following table shows the number of receivals for penal imprisonment in gaols in Western Australia during each of the six years to 30 June 1981. It is important to note that the figures relate to *receivals* and not to *distinct persons*, i.e. a prisoner has been counted once for each time he or she was received.

PENAL IMPRISONMENT — NUMBER OF RECEIVALS (a)

Institution	Year ended 30 June —											
	1976		1977		1978		1979		1980		1981	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Prisons —												
Fremantle (b)	1,344	..	1,129	..	1,062	..	1,455	..	1,241	(c) ..	769	..
Albany	225	1	97	—	79	—	108	—	112	—	88	—
Bandyup Training Centre	..	204	..	127	..	120	..	158	..	(c) 190	..	144
Barton's Mill (d)	..	..	..	..	..	..	..	..	..	..	31	..
Broome	169	10	475	80	367	74	209	34	235	25	310	62
Brunswick Junction	106	..	38	..	35	..	32	..	41	..	47	..
Bunbury Rehabilitation Centre	218	..	129	..	85	..	151	..	120	..	110	..
C. W. Campbell Remand Centre (e)	..	..	..	..	..	..	..	..	..	..	257	..
Eastern Goldfields (f)	..	..	..	..	..	..	..	..	..	..	172	40
Geraldton	471	13	349	27	259	13	335	26	323	16	363	40
Kalgoorlie	316	32	349	47	369	49	401	73	402	62	346	40
Karnet Rehabilitation Centre (g)	..	..	..	..	..	..	..	..	29	..	14	..
Pardelup Prison Farm (g)	..	..	..	..	..	..	..	..	1	..	6	..
Roebourne (h)	204	29	268	111	287	135	280	77	295	79	384	77
West Perth Work Release Hostel	..	..	..	..	..	..	..	..	1	..	—	..
Wooroloo Training Centre	403	..	259	..	244	..	183	..	328	..	501	..
Wyndham	180	20	238	70	221	32	198	37	213	55	169	29
Total	3,636	309	3,331	462	3,008	423	3,352	405	3,341	427	3,567	432
Police gaols	504	213	106	4	17	—	39	—	67	—	72	—
GRAND TOTAL	4,140	522	3,437	466	3,025	423	3,391	405	3,408	427	3,639	432

(a) Excludes imprisonment for debt and receivals of persons on remand. (b) Prior to 1981 includes figures for Barton's Mill Prison: prior to 1980 includes figures for Karnet Rehabilitation Centre and Pardelup Prison Farm. (c) One transsexual prisoner was received at Fremantle but was later taken to Bandyup. (d) See footnote (b). (e) Opened 1 May 1980. (f) Opened 18 December 1980. (g) See footnote (b). (h) Opened 12 March 1976.

The main institution is Fremantle Prison (maximum security) and there are regional prisons at Albany (maximum/medium security), Boulder (minimum security), Broome (medium security), Geraldton (minimum security), Roebourne (medium security) and Wyndham

(minimum security). Barton's Mill Prison, Brunswick Junction Prison, Karnet Rehabilitation Centre, Pardelup Prison Farm and Wooroloo Training Centre are minimum security institutions. Bunbury Regional Prison, Bandyup Women's Training Centre (the main prison for females) and Kalgoorlie Regional Prison, which has largely been replaced by the new Eastern Goldfields minimum security regional prison at Boulder, are medium security institutions. At Canning Vale the ninety-eight bed C.W. Campbell Remand Centre was opened in May 1980 and the 248-bed maximum security prison was commissioned on 27 November 1981. West Perth Work Release Hostel caters for male work release prisoners, with a small hostel at Highgate catering for females.

Work and educational opportunities vary from prison to prison. All prisons employ some prisoners in maintenance, cleaning and cooking tasks, whilst at the larger and better equipped institutions, workshops provide additional employment and some training in such areas as carpentry, sheetmetal work, welding and motor mechanics. The farms provide employment and some training in various aspects of agriculture. Full or part-time educational facilities are available at Albany, Pardelup, Bunbury, Brunswick, Fremantle, Bandyup, Broome and Wyndham. Work release prisoners are located either at the institution at which they are serving their sentence or are transferred to West Perth in the case of males or Highgate in the case of females.

The following table shows the number of prisoners, excluding trial and remand prisoners and debtors, in gaols in Western Australia at 30 June in each year from 1976 to 1981.

PRISONERS IN GAOL

Institution	At 30 June —											
	1976		1977		1978		1979		1980		1981	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Prisons —												
Fremantle	348	..	395	..	396	..	526	..	533	..	464	..
Albany	38	—	48	—	57	—	63	—	62	—	63	—
Bandyup Training Centre	..	35	..	29	..	37	..	(a) 57	..	(a) 38	..	(a) 42
Barton's Mill (b)	..	..	..	..	55	..	70	..	80	..	77	..
Broome	33	—	40	3	22	—	26	1	59	2	35	—
Brunswick Junction	23	..	15	..	22	..	26	..	16	..	22	..
Bunbury Rehabilitation Centre	37	..	63	..	62	..	71	..	64	..	69	..
C. W. Campbell Remand Centre (c)	..	..	..	..	..	..	..	..	20	..	1	..
Eastern Goldfields (d)	..	..	..	..	..	..	..	..	..	..	48	2
Geraldton	55	2	90	2	75	—	79	1	75	3	53	2
Kalgoorlie	26	1	36	2	40	—	38	4	32	4	15	—
Karnet Rehabilitation Centre	65	..	71	..	79	..	73	..	87	..	88	..
Pardelup Prison Farm	30	..	27	..	50	..	56	..	42	..	28	..
Roebourne	25	2	23	3	28	2	53	—	51	1	56	6
West Perth Work Release Hostel	29	..	32	..	29	(a) 6	32	..	30	..	37	..
Wooroloo Training Centre	103	..	103	..	108	..	123	..	118	..	119	..
Wyndham	10	—	24	2	30	—	19	—	18	1	13	—
Total	822	40	967	41	1,053	45	1,255	63	1,287	49	1,188	52
Police gaols	11	—	22	2	22	—	14	—	23	—	(f) 16	—
GRAND TOTAL	833	40	989	43	1,075	45	1,269	63	1,310	49	1,204	52

(a) Includes Highgate Annexe. (b) Closed 31 October 1975, re-opened 31 October 1977. (c) Opened 1 May 1980.
 (d) Opened 18 December 1980. (e) Includes six persons in public hospitals. (f) Includes two persons in public hospitals.

The police gaol at East Perth holds prisoners awaiting trial and some short-term prisoners. In addition, provision is made for holding some prisoners with very short sentences at police lock-ups throughout the State.

PROBATION AND PAROLE SERVICE

The Probation and Parole Service, a branch of the Crown Law Department, is constituted under the provisions of the *Offenders Probation and Parole Act 1963-1977*. Parole was brought into operation on 1 October 1964, probation on 1 January 1965 and community service orders on 1 February 1977.

Probation is an alternative to imprisonment; it consists of the conditional suspension of punishment while the offender is placed under the personal supervision of a probation officer and is given guidance, counselling and assistance for his rehabilitation in the community. Parole is the conditional release of selected prisoners under the personal supervision of a parole officer after the offender has served part of his sentence in a penal institution. A Community Service Order is a non-custodial order of the court. It entails the offender consenting to spend some of his leisure time in projects which will benefit the community. In this way he repays to the community a debt incurred through his offending act.

One of the main functions of the Probation and Parole Service is to provide pre-sentence reports on convicted persons to the sentencing authorities. The purpose of the report is to assist the Court in coming to a decision as to sentence which is, as far as possible, in the best interests of the community and the offender. An aim of the Service has been to decentralise its activities. The first country office was opened in October 1973 at Albany. The following additional country offices have since been opened: Geraldton (1976); Kalgoorlie (1977); Bunbury (1978); Port Hedland (1978) and Broome (1979). In the metropolitan area there are District Offices at Fremantle, Bentley and Mirrabooka and a number of Reporting Centres at other localities.

The Act establishes a Parole Board of seven members comprising a Judge of the Supreme Court as Chairman, the Director of the Department of Corrections, and three men and two women appointed by the Governor. Female prisoners are dealt with by a Board comprising five of the Parole Board members.

The Act requires that where a person is sentenced to imprisonment for twelve months or longer the court shall, unless special circumstances make it inappropriate, fix a minimum term during which the convicted person is not eligible to be released. The court is given discretionary power to fix a minimum term where the sentence is for less than twelve months. Provision is made for remission of up to three days per month on the minimum term, as a reward for good conduct or industry. Where no minimum term has been fixed, remission of up to 26 per cent of the sentence may be allowed for diligence and good conduct.

The Parole Board is empowered to release on parole a prisoner who has served a minimum term fixed by a court, or a prisoner being detained at the Governor's pleasure.

The Governor may, on the recommendation of the Parole Board, direct the release on parole of a prisoner sentenced to imprisonment for life, a prisoner undergoing a sentence of imprisonment for life commuted from a sentence of death, or an unconvicted person held in custody during the Governor's pleasure following acquittal because of unsoundness of mind. The Parole Board is required to submit to the Minister, at prescribed intervals, a report and a recommendation concerning such prisoners.

Parole officers establish contact with prospective parolees during their imprisonment, prepare a case history of each prisoner for the information of the Parole Board, and supervise paroled persons during the parole period.

PROBATION AND PAROLE SERVICE

Particulars	Year ended 30 June —					
	1976	1977	1978	1979	1980	1981
PROBATION						
Number of probation orders —						
Current at beginning of period						1,653
Issued during period						1,078
Total current for all or part of period						2,731
Terminated by compliance	n.a.	n.a.	n.a.	n.a.	n.a.	890
Terminated—breach action taken						251
Total current at end of period						1,590
Number of persons —						
Under supervision at beginning of period						n.a.
Under supervision at end of period						1,478
PAROLE						
Number of persons —						
Under supervision at beginning of period	599	561	534	505	525	498
Released on parole during period	407	410	358	338	340	362
Total under supervision during period	1,006	971	892	843	865	860
Cancellation of parole	166	147	123	75	64	76
Completion of parole	279	290	264	243	303	281
Total under supervision at end of period	561	534	505	525	498	503

PUBLIC SAFETY

National Safety Council

The National Safety Council of Western Australia was founded in January 1946 following discussions among office bearers and senior officials of the Royal Automobile Club of Western Australia and police and education authorities about the creation of an organisation for the prevention of accidents.

Although the Council has been primarily concerned with road traffic safety and training courses associated with it, a Home Safety Division was established in 1963 and a Water Safety Division in 1965 and these also conduct a wide range of practical training courses. An Industrial Safety Division was also formed but now operates as a separate organisation although it is affiliated with the Council.

The National Safety Council of Western Australia is the State member division of the National Safety Council of Australia and is also represented on the Federal Publicity Advisory Committee on Education in Road Safety.

The Council aims at the prevention of accidents by the co-ordination of the efforts of relevant organisations and by an educational programme in accident prevention techniques. It pursues its objectives through the voluntary service of executive members, the financial support of the Government, and the staff and facilities of the Safety Instructional Centre at Mount Lawley. This Centre, situated on about seven and one-quarter hectares of land close to Perth, comprises a complete road system and a comprehensive office complex including a projection theatre and lecture rooms.

Fire Protection

Western Australian Fire Brigades Board. The *Fire Brigades Act 1942-1979* constitutes the Western Australian Fire Brigades Board of ten members. The Board comprises two members appointed by the Governor, one of whom is president of the Board; three members elected by the insurance companies carrying on business in the State; one member elected by the Council of the City of Perth; three members elected by other local government authorities; and one member elected by the registered volunteer fire brigades. The general duties of the Board are to take, superintend and enforce all necessary steps for the prevention and extinguishing of fires and the protection of life and property from fire, and the control of all fire brigade premises and of all fire brigades.

The number of fire calls received in the metropolitan fire district and other fire districts in each of the six years 1975-76 to 1980-81 is given in the following table.

WESTERN AUSTRALIAN FIRE BRIGADES BOARD — CALLS RECEIVED

Year	Number of fire calls						Number of calls for special services	Total calls
	False alarms	Fires causing negligible damage	Other fires causing damage estimated at —					
			Less than \$250 (a)	\$250 (a) to \$10,000	\$10,001 to \$250,000 (b)	More than \$250,000 (b)		
METROPOLITAN FIRE DISTRICT (c)								
1975-76	2,403	3,120	267	208	7	5	428	6,438
1976-77	2,567	2,607	589	463	45	3	403	6,677
1977-78	2,864	2,923	516	511	51	1	416	7,282
1978-79	3,257	3,252	554	713	77	3	432	8,288
1979-80	3,402	3,013	513	721	74	2	404	8,129
1980-81	3,116	3,389	536	722	65	5	457	8,290
OTHER FIRE DISTRICTS								
1975-76	226	1,371	120	112	11	1	103	1,944
1976-77	266	1,206	279	270	31	1	97	2,150
1977-78	274	1,140	176	235	30	—	97	1,952
1978-79	189	832	172	188	38	3	99	1,521
1979-80	185	693	165	231	41	3	79	1,397
1980-81	219	810	116	213	40	3	110	1,511
WESTERN AUSTRALIA								
1975-76	2,629	4,491	387	320	18	6	531	8,382
1976-77	2,833	3,813	868	733	76	4	500	8,827
1977-78	3,138	4,063	692	746	81	1	513	9,234
1978-79	3,446	4,084	726	901	115	6	531	9,809
1979-80	3,587	3,706	678	952	115	5	483	9,526
1980-81	3,335	4,199	652	935	105	8	567	9,801

(a) \$200 prior to 1976-77.

(b) \$200,000 prior 1976-77.

(c) As defined in the Fire Brigades Act.

Fifteen permanent and two volunteer brigades operate in the metropolitan fire district centred on the City of Perth. Permanent brigade personnel serve with volunteer brigade personnel in five large country centres, and volunteer brigades provide town fire protection at eighty-two other centres. At 30 June 1981, the Board had 844 employees and there were 1,944 volunteer brigade officers and firemen.

Bush Fires Board. The Bush Fires Board, which is constituted under the *Bush Fires Act 1954-1981*, consists of sixteen members appointed by the Governor on the recommendation of the Minister. It comprises the Under Secretary for Lands as chairman; six persons nominated by the Country Shire Councils' Association of W.A.; and one person nominated by each of the following: the Minister for Forests, the Minister for Agriculture, The Western Australian Government Railways Commission, the Insurance Council of Australia, the Commissioner of Police, the Forest Products Association (W.A.), the State Regional Director of the Bureau of Meteorology, the Western Australian Wildlife Authority and the National Parks Authority of Western Australia. The principal functions of the Board are to administer the Bush Fires Act; to report to the Minister on methods of preventing or extinguishing bush fires; to recommend the prohibited and restricted burning times to be declared for the whole or any part of the State for any yearly period; to carry out such fire prevention measures as it considers necessary; to carry out research in connection with fire prevention and control; to conduct publicity campaigns for the purpose of improving fire prevention measures; and to provide training facilities for volunteers.

The Board operates through its staff of liaison officers based in country centres. These officers promote fire protection by the exercise of co-ordination, liaison and advisory functions.

Local authorities throughout the State handle local administration of the Bush Fires Act.

CHAPTER VI — FINANCE

Part 1 — Public Finance

COMMONWEALTH-STATE FINANCIAL RELATIONS

Financial Agreement 1927. Under the terms of the Financial Agreement, the Commonwealth Government took over from the States their public debts existing at 30 June 1927 and assumed responsibility for all future loan raisings by the Commonwealth and State Governments. The Commonwealth Government also agreed to contribute annually for a period of fifty-eight years from 1 July 1927 an amount of \$15,169,824 towards the interest payable on the States' debts, Western Australia's share of this amount being \$946,864.

Sinking Funds established by the Financial Agreement between the Commonwealth Government and the States were designed to redeem the States' debts as follows: (a) debt existing at 30 June 1927, in a period of fifty-eight years thereafter; (b) debt incurred after 30 June 1927 (except debt for the purpose of redemptions or conversions or the financing of revenue deficits), in a period of fifty-three years from the date of creation of the debt; (c) debt incurred to finance revenue deficits for the years 1929-30 to 1934-35, in a period of thirty-nine years from 30 June 1944; and (d) debt incurred to finance other revenue deficits, in a period of approximately seventeen years from the date of its creation.

These Sinking Funds are under the control of the National Debt Commission. Receipts of the Funds consist mainly of contributions from the Consolidated Revenue Funds of the Commonwealth and State Governments. The Commonwealth Government and the States make annual contributions towards the redemption of debt existing at 30 June 1927 and subsequent debt created over the period 1 July 1927 to 30 June 1975.

Contributions made by the Commonwealth Government and the States in respect of the States' debts are not accumulated but must be applied by the National Debt Commission, whenever expedient, to the redemption and repurchase of loan securities. Under the provisions of the Financial Agreement, repurchased or redeemed securities must be cancelled, and the debts of the States are reduced accordingly.

Financial Agreement 1976. The *Financial Agreement Act* 1976 amended the Financial Agreement of 1927 by establishing a new scale of sinking fund contributions in respect of State debt. Under provisions of the Act, Western Australia provided an amount of \$16.0 million and the Commonwealth an amount of \$39.9 million in respect of the year 1980-81. The Act, which applied retrospectively to 30 June 1975 also provided for the transfer of \$1,000 million of State debts to the Commonwealth with effect from 30 June 1975. The amount of debt transferred under this amendment in respect of Western Australia was \$96.1 million.

Australian Loan Council. The Australian Loan Council was established by the Financial Agreement Act of 1928 to co-ordinate the public borrowings of the Commonwealth and State Governments. The Council has as its Chairman the Prime Minister of Australia, or a Minister nominated by him, and the other members are the Premiers of the States or, in the absence of a Premier, a Minister nominated by him. The Commonwealth and each State submits to the Council a programme of its desired loan raisings during each financial year, including the amount of any revenue deficit to be funded. The Commonwealth Government's borrowings for defence purposes are expressly excluded from its submissions to the Council. If the Council decides that the total amount of the loan programme for a year cannot be borrowed at reasonable

rates and conditions, it decides the amount to be borrowed during the year, and may by unanimous decision allocate this amount between the Commonwealth and the States. Where the members fail to arrive at a unanimous decision the Commonwealth is entitled to a maximum of one-fifth of the total sum to be borrowed. Of the balance, each State is entitled to an amount in the proportion which its net loan expenditure during the preceding five years bears to the aggregate for all the States.

For 1980-81 the Loan Council approved a borrowing programme for the States of \$1,307 million of which \$871 million comprised borrowings and \$436 million was provided as capital grants to the States. Western Australia's share amounted to \$120.9 million, comprising \$80.6 million for borrowings and \$40.3 million for capital grants.

At the June 1978 meeting of the Loan Council, new guidelines were approved for its consideration of special additions to the borrowing programmes of larger authorities for the purpose of financing infrastructure. The guidelines apply to Commonwealth and State public corporations and to local authorities. They do not apply to borrowings by the Commonwealth and State Governments.

Under the guidelines, each proposal for a special addition to the borrowing programme is examined according to certain criteria including economic feasibility; special significance to the economic development of Australia; importance and urgency; and the need for the loan. In special circumstances, borrowing overseas may be arranged. Approval by the Loan Council of special borrowings for financing infrastructure requires the agreement of a simple majority and the Commonwealth Government.

Actual borrowing under the guidelines for Australia amounted to \$651.4 million in 1980-81. In the year 1981-82 approvals for borrowing amounted to \$828.7 million of which Western Australia's share amounted to \$121.2 million.

Financial Assistance Grants. Annual Financial Assistance Grants were made to every State from 1959-60 to 1975-76. In addition to the annual Financial Assistance Grants, special revenue assistance has been provided in some years and details of these and other payments are shown in the next table under the heading *General Purpose Grants*.

At a series of Premiers' Conferences held in February, April and June 1976 it was announced that the Financial Assistance Grants were to be replaced by arrangements under which each State would receive a share of Commonwealth personal income tax collections.

Personal Income Tax Entitlements. The *States (Personal Income Tax Sharing) Act 1976* which repealed the States Grants Acts of 1973, 1974 and 1975 operated with effect from the year commencing 1 July 1976 and for subsequent years. The Act provided for the States to share 33.6 per cent of personal income tax collected by the Commonwealth in each year. Each State's share was to be determined according to its estimated population at 31 December of the relevant financial year, after 'weighting' that population according to the financial ratios which applied between the States in 1975-76. It was further provided that the States' entitlements in any year would be not less than in the previous year. In addition, for a period of four years ending 30 June 1980, entitlements were not to be less in a year than the amount which would have been available in that year by the financial assistance grants authorised by the *States Grants Act 1973*. The Act also provided that the Commonwealth Government should consult with the State Governments before 30 June 1981 concerning the need for changes in the provisions of the Act.

The *States (Personal Income Tax Sharing) Amendment Act 1978* provided, subject to the guarantee arrangements contained in the principal Act that the States' entitlements would be \$4,336.1 million for 1977-78, and for subsequent years 39.87 per cent of the net personal income tax collections for the preceding year. In the year 1980-81 Western Australia's share amounted to \$734.2 million. A further amendment provides for periodic reviews by a special division of

the Commonwealth Grants Commission of the relativities between the States in their tax sharing entitlements. Further details are provided later in this Chapter under the heading *Commonwealth Grants Commission*.

From the Premiers' Conferences held in 1976 and 1977, a further understanding was reached that each State would be able to legislate to impose a surcharge on personal income tax, or grant a rebate on personal income tax. In either case the Commonwealth Government would act as an agent for the State. Enabling legislation was authorised in June 1978 by the *Income Tax (Arrangements with the States) Act 1978*.

At the Premiers' Conference in December 1979, it was agreed that the provisions of the *States (Personal Income Tax Sharing) Act 1976*, as amended, should continue for the year 1980-81. However, there was to be an additional guarantee that each State would receive no less in real terms than the amount it received in 1979-80 as measured by the Consumer Price Index for the four quarters to March 1981, compared with the four quarters to March 1980. This guarantee was authorised by the *States (Personal Income Tax Sharing) Amendment Act 1980*.

The *States (Tax Sharing and Health Grants) Act 1981*, enacted in June 1981 repealed the *States (Personal Income Tax Sharing) Act 1976* and *States (Personal Income Tax Sharing) Amendment Acts* of 1978 and 1980.

The 1981 Act, agreed to between the Commonwealth, States and Northern Territory at the May 1981 special Premiers' Conference and the subsequent Premiers' Conference in June 1981, provides for a number of new features not previously included in the financial arrangements between the Commonwealth and the States. The more important of these are: (i) substitution of the former net personal income tax collection base with a total tax base after 1981-82 and (ii) new identifiable, general purpose health grants to replace the former public hospital cost-sharing arrangements with the States (other than South Australia and Tasmania) and the Northern Territory.

It was further agreed that there would be no change to the per capita relativities between the States in respect of the year 1981-82.

In addition a 9 per cent increase in the total basic tax sharing grants for the States and the Northern Territory was to apply and, within this 9 per cent the provision, for 1981-82 only, of rounding adjustments to the basic grants for the States to ensure each State received an increase in its estimated base grant of not less than 8 per cent.

For the year 1981-82 Western Australia's share amounted to \$957.2 million, which comprised \$801.5 million basic tax sharing grant, \$150.9 million health grant and \$4.8 million allocation for the termination of a number of Commonwealth expenditure programmes.

The *Local Government (Personal Income Tax Sharing) Act 1976* provided that from 1976-77 local government would receive 1.52 per cent of personal income tax collections in the previous year. Subsequent amendments to the Act in 1979 and 1980 increased this percentage to 1.75 and 2.0 respectively. The Act also provides that allocations should be made as prescribed and have regard to the recommendation of a Local Government Grants Commission which was to be constituted in each State not later than 30 June 1978. Legislation constituting the Western Australian Local Government Grants Commission became effective on 11 May 1978 under the authority of the *Local Government Grants Act 1978*. Western Australia's share for 1978-79, 1979-80 and 1980-81 amounted to \$16.8 million, \$20.8 million and \$28.2 million respectively. Further details are shown under the heading the *Local Government System* in Chapter III.

Commonwealth Grants Commission. Section 96 of the Commonwealth Constitution provides that the States may be granted financial assistance. In 1933 the Commonwealth Parliament passed the Commonwealth Grants Commission Act establishing a Commission to inquire into and report on applications made by States for grants of financial aid.

COMMONWEALTH GOVERNMENT PAYMENTS TO WESTERN AUSTRALIA
(\$'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
GRANTS						
General public services	659	1,379	1,857	1,939	1,364	1,485
Education —						
Government schools	19,984	22,108	22,998	31,389	37,248	29,843
Non-government schools	11,624	9,807	14,864	17,858	19,227	22,504
Technical education	2,755	6,198	7,296	7,514	8,886	15,261
Universities	35,692	37,985	50,616	54,127	53,503	56,196
Colleges of advanced education	39,640	43,866	51,316	53,278	55,423	56,334
Aboriginal education	2,381	2,004	2,154	2,245	2,155	2,070
Pre-schools and child care	4,608	6,456	5,744	6,444	6,597	4,860
Other	1,716	2,126	2,730	2,875	3,452	3,400
Total	118,400	130,550	157,718	175,730	186,491	190,468
Health —						
Medibank —						
Public hospital running costs	—	96,745	74,674	109,714	117,017	126,313
Public hospitals	4,326	11,900	12,000	4,680	—	—
Aboriginal health	6,060	7,368	5,593	6,135	6,334	6,257
School dental scheme	2,067	5,126	3,589	3,849	2,700	3,970
Community health	4,003	2,877	5,696	5,330	4,610	4,819
Other	1,665	1,257	1,576	1,029	1,093	1,253
Total	18,121	125,273	103,128	130,737	131,754	142,612
Social security and welfare —						
Employment grants	3,400	2,000	—	—	—	—
Regional Employment Development Scheme	5,503	9,123	1	—	—	—
Assistance for deserted wives	1,152	1,459	1,700	1,848	3,841	3,092
Aboriginal welfare	3,124	1,820	1,023	630	647	1,478
Other	418	1,477	1,839	1,389	1,824	5,011
Total	13,597	15,879	4,563	3,867	6,312	9,581
Housing and community amenities —						
Aboriginal housing	—	2,882	3,938	3,700	4,120	4,508
Sewerage	3,890	3,875	2,928	76	—	—
Other	3,476	3,109	1,351	627	667	9,532
Total	7,366	9,866	8,217	4,403	4,787	14,040
Recreation and related cultural services	2,898	1,111	1,226	555	448	338
Economic services —						
Water resources investigations	1,667	1,981	2,000	2,000	3,053	3,920
Rural reconstruction	908	1,137	1,036	63	—	—
Roads	50,449	62,225	58,053	62,045	64,963	69,856
Urban public transport	2,829	750	1,869	605	2,015	1,533
Other	2,599	3,582	3,828	4,851	5,803	3,420
Total	58,452	69,675	66,786	69,564	75,834	78,729
Other purposes —						
General purpose grants —						
Capital assistance	32,179	40,099	42,117	44,220	44,226	38,400
Debt charges assistance	5,528	—	—	—	—	—
Financial assistance (a)	279,830	363,031	440,800	519,891	579,532	662,888
Interest on State debts	947	947	947	947	947	947
Local government (Grants Commission)	4,959	7,524	13,162	15,524	16,848	20,821
Sinking fund on State debt	2,976	2,800	2,981	3,175	3,377	3,576
Special revenue assistance	7,073	—	—	—	—	—
Natural disaster relief	—	4,280	1,701	2,784	1,524	1,350
Total	333,492	418,681	501,708	586,541	646,454	727,982
GRAND TOTAL	552,985	772,414	845,203	973,336	1,053,442	1,165,235
Current	408,744	603,775	687,806	815,505	891,860	1,004,255
Capital	144,241	168,640	157,397	157,831	161,582	160,980

COMMONWEALTH GOVERNMENT PAYMENTS TO WESTERN AUSTRALIA — *continued*
(\$'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
ADVANCES						
Gross advances —						
Defence (housing for servicemen)	784	698	1,230	2	—	50
Housing and community amenities —						
Housing assistance	37,440	33,440	35,440	36,740	29,767	15,072
Land acquisition and development in urban areas	9,833	r 6,133	3,882	5,026	2,537	2,771
Sewerage in principal urban areas	11,715	8,680	6,300	—	—	—
Economic services	4,719	r 6,686	4,839	4,294	9,377	2,644
Other purposes —						
State works programmes (b)	68,068	80,197	84,235	88,446	88,446	76,799
Natural disaster relief	—	67	2,001	15,714	6,895	7,092
Total, Gross advances	132,559	r 135,901	137,927	150,222	137,021	104,428
Net advances (c) —						
Defence (housing for servicemen)	744	655	1,185	—46	—50	—3
Housing and community amenities —						
Housing assistance	37,438	33,438	33,263	34,297	27,031	12,106
Land acquisition and development in urban areas	9,833	r 6,133	3,882	5,026	2,537	2,771
Sewerage in principal urban areas	11,709	8,666	6,243	—80	—92	—101
Other	—1,678	—1,945	—14	—12	—14	—19
Economic services	2,521	r 4,014	1,566	616	6,232	—1,597
Other purposes —						
State works programmes (b)	52,732	65,366	68,473	71,607	70,275	57,694
Natural disaster relief	—	67	2,001	15,714	6,639	7,092
Total, Net advances	113,299	r 116,394	116,599	127,122	112,557	77,944

(a) Including payments in place of Special Grants, repayments.

(b) Australian Loan Council borrowing.

(c) Gross advances less

In each year from 1934-35, in respect of which the Commission made its first recommendation, Western Australia received a Special Grant until it ceased to be a claimant State from and including the year 1968-69, in accordance with an agreement made between the Commonwealth and the State at a Premiers' Conference in June 1968.

The *Commonwealth Grants Commission Act 1973*, which repealed the *Commonwealth Grants Commission Act 1933* and later amendments, continued the principle of making special assistance available to a State for its own purposes and, in addition, authorised the provision of assistance to a State for local government purposes. Grants to Western Australia, for distribution among local government authorities as recommended by the Grants Commission, amounted to \$4.96 million for the year 1974-75 and \$7.52 million for 1975-76.

From 1976-77, new arrangements operated with the passing of the *Commonwealth Grants Commission Act 1976* and the *Local Government (Personal Income Tax Sharing) Act 1976*. Reference has been made in the preceding section to an amendment contained in the *States (Personal Income Tax Sharing) Amendment Act 1978* which provides for periodic reviews by a special division of the Commonwealth Grants Commission of the relativities between the States in their tax sharing entitlements. In conjunction with this Act, the *Commonwealth Grants Commission Amendment Act 1978* provided for the constitution of a division of the Commission comprising the Chairman and two members of the Commission, in addition to three associate members, one of whom would be nominated by the governments of New South Wales and Victoria and two by the governments of the four remaining States. The factors to be taken into consideration in the conduct of inquiries by the special division of the Commonwealth Grants Commission and the method of its operation are as prescribed by the two Acts mentioned.

The special division of the Commonwealth Grants Commission presented its report on State tax sharing entitlements in June 1981. The Commission found that a change was desirable in State factors which prescribe the per capita relativities between the States.

However, the implications of the significant decreases in tax sharing grants payable in 1981-82 to South Australia (\$77 million), Western Australia (\$160 million) and Tasmania (\$64 million) if the distribution between the States were to be based on the Commission's recommendations, led to the decision to make no change in the per capita relativities for the year 1981-82.

Other Financial Assistance. As well as providing general financial assistance to the States by means of grants, the Commonwealth Government allocates to them funds for specific purposes, as shown in the preceding table which gives details of payments made to Western Australia during the six-year period ended 30 June 1980. Grants in the financial year 1979-80 totalled \$1,165,063,000 while net advances for the same period amounted to \$77,943,000. Social service benefits and national health benefits are paid from the National Welfare Fund. In addition, financial assistance for housing and war service land settlement is provided from the Loan Fund.

Cash Benefits to or for Persons

The following table gives details of all cash benefits paid during the six-year period ended 30 June 1980. Cash benefits to or for persons in Western Australia increased from \$327,850,000 to \$778,509,000 over the period. Social security and welfare amounted to \$655,774,000 in 1979-80 or 84.2 per cent of the total cash benefits, followed by Health with \$94,104,000 or 12.1 per cent.

COMMONWEALTH GOVERNMENT CASH BENEFITS TO OR FOR PERSONS IN
WESTERN AUSTRALIA (a)
(\$'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Education —						
Primary and secondary education	2.967	2.728	2.770	3.833	3.812	3.875
University education	9.509	13.315	16.228	r 8.620	r 8.777	8.907
Other higher education	1.876	2.563	3.021	r 6.040	r 6.222	5.805
Other education programmes				r 6.748	r 7.811	8.705
Total	14.352	18.606	22.019	25.241	26.622	27.292
Health —						
Hospital and clinical services —						
Hospital benefits for pensioners	2.276	606	..	..	..	..
Hospital benefits reinsurance	—	—	—	1.288	—2.100	—3.378
Hospital benefits n.e.c.	8.818	6.257	1.225	19	9	—
Medibank —						
Private hospital daily bed payments	..	5.175	5.993	5.883	5.940	5.481
Nursing home benefits	14.665	18.772	22.228	24.384	26.390	31.149
Other	85	94	92	141	102	106
Other health services —						
Medibank —						
Medical benefits	..	42.067	35.702	21.168	36.301	—
Medical benefits for pensioners	3.539	372	..	..	..	..
Medical benefits n.e.c.	15.898	5.737	74	19	—	40.845
Pharmaceutical benefits for pensioners	5.310	7.104	7.609	8.469	9.917	11.047
Pharmaceutical benefits n.e.c.	8.834	9.999	8.185	8.854	8.370	7.670
Other	762	847	912	877	930	1.184
Total	60.187	97.030	82.020	71.102	85.859	94.104
Social security and welfare —						
Assistance to aged persons —						
Age pensions	118.492	156.447	183.519	216.111	238.241	258.650
Other	1.537	2.020	2.456	2.489	2.735	3.154
Assistance to incapacitated and handicapped persons —						
Invalid pensions	20.320	27.066	33.666	39.321	46.592	54.228
Other	1.791	2.437	3.531	4.417	4.886	5.426
Assistance to unemployed and sick persons —						
Unemployment benefits	19.753	33.824	42.958	59.324	82.842	87.402
Sickness benefits	4.415	6.190	6.814	7.585	7.200	8.676
Other	1.028	1.329	1.373	2.118	2.905	4.679
Assistance to ex-servicemen —						
War and service pensions and allowances	36.996	43.677	52.519	62.501	67.067	74.995
Other benefits	345	297	263	280	209	207
Assistance to widowed and deserted spouses —						
Widows' pensions	18.459	24.809	27.700	32.290	36.329	40.647

COMMONWEALTH GOVERNMENT CASH BENEFITS TO OR FOR PERSONS IN
WESTERN AUSTRALIA (a) — *continued*
(\$'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Assistance to families and children —						
Family allowance (b)	19,084	22,737	89,514	90,809	88,151	89,558
Supporting parents' benefits	8,102	12,547	15,588	18,602	22,996	27,590
Other	735	733	738	743	450	142
Other social security and welfare programmes	228	313	321	342	388	420
Total	251,285	334,426	460,960	536,932	600,991	655,774
Economic services —						
General administration, regulation and research —						
National Employment and Training Scheme	1,068	3,384	1,514	1,748	2,032	1,241
Other	552	1,421	728	471	116	98
Total	1,620	4,805	2,242	2,219	2,148	1,339
Other purposes —						
Natural disaster relief	405	33	—	—	—	—
TOTAL, ALL CASH BENEFITS	327,850	454,900	567,241	635,494	715,620	778,509

(a) For conditions and rates applying to payment of social service benefits, health benefits, and other forms of assistance, see Chapter V. Because of the administrative arrangements made for the payment of certain benefits it has not been practicable to allocate amounts for those benefits precisely between States. In such cases, estimates have been made. (b) Prior to 15 June 1976 known as child endowment.

The main components of cash benefits are hospital, medical, pharmaceutical, sickness and unemployment benefits, family allowance, and widows', age, invalid and repatriation pensions. These are paid from the National Welfare Fund which was established in 1943 by the National Welfare Fund Act. Further reference to the Fund will be found at the beginning of Chapter V, Part 4. Other cash benefits include scholarships and payments to trainee teachers.

STATE GOVERNMENT FINANCE

The tables in the following pages relate to the financial activities of the Government of Western Australia, statutory authorities, boards, commissions and corporations, and incorporated bodies in which the State Government or its agencies have a controlling interest (other than financial enterprises).

The revised series is designed to provide, for the public sector, statistics which complement the accounts for individual sectors provided in the Australian National Accounts. These statistics are intended to consolidate the transactions of the various public authorities and present them so that their economic impact may be assessed; to show the purposes that are being served by government expenditures; and to show the roles of the various levels of government in the undertaking and financing of these expenditures.

Basic principles which have been followed in developing the data for the economic accounts for the public sector are that all public authorities should be included; all funds under the control of those authorities should be analysed; and transfers between funds, accounts and authorities should be eliminated to present tables on a consolidated basis.

In this section of the Year Book the public sector has been taken to comprise general government bodies (excluding local government authorities) and public trading enterprises. Public financial enterprises have been omitted from the consolidated accounts presented here, largely on the ground that combining the income and outlay and capital financing transactions of publicly-owned trading and savings banks, government insurance offices and other public financial institutions with the equivalent transactions of public trading enterprises and general government seems to provide a less meaningful account of public sector activity.

General government bodies are all of the agencies of government not classified as public enterprises, i.e. all government departments, offices and other bodies engaged in providing services free of charge or at prices significantly below their cost of production.

Public trading enterprises are government undertakings which aim at covering the bulk of their expenses by revenue from sales of goods and services.

Details of the State Authorities whose accounts have been analysed for the purposes of the statistics presented here may be found in the publication *Finance* (Catalogue No. 5101.5), issued by this Office.

The classifications used in the tables are, generally, in accordance with those adopted in the publication *A System of National Accounts*, United Nations, New York, 1968 which is a widely accepted international standard for the classification of government financial transactions. Two of the main classifications used in that publication are classifications by economic type and by purpose.

The economic type classification, in broad terms, is designed to categorise transactions between public authorities and the private sector, and between public authorities where sub-sectors of the public sector have been identified, in a way which facilitates a study of the impact of government transactions on the economy.

The purpose classification scheme is the medium by which outlays with similar objectives are brought together to reveal more fully the broad purposes of public sector spending, and to provide a framework for developing means of assessment of the effectiveness of outlays in achieving government policies. With the classification of outlays by economic type, the purpose classification also facilitates the assessment of the economic impact of identified programmes of expenditure.

Figures for some items published in the public authority finance series may differ from issue to issue as a consequence of reclassification of items and other improvements made in the course of developing the most appropriate presentation of the financial transactions of public authorities.

For further information on the methods and principles used in compiling data for Western Australia, reference may be made to the publication *Finance* (Catalogue No. 5101.5), issued by this Office.

STATE AUTHORITIES: RECEIPTS ACCORDING TO SOURCE (\$'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Taxes, fees, fines	203.670	260.135	300.183	342.980	r 375.606	419.969
Income from public enterprises	25.163	49.257	25.021	22.896	27.358	16.599
Income from property —						
Interest	20.735	15.899	21.224	34.264	31.007	59.841
Land rent	4.859	4.523	5.675	6.214	8.576	10.325
Royalties	43.604	48.271	57.347	60.760	64.737	74.263
Dividends	2	2	2	—	—	—
Total, Income from property	69.200	68.695	84.248	101.238	104.320	144.429
Grants from the Commonwealth Government —						
For current purposes	403.192	595.416	684.268	815.321	890.664	1,002.941
For capital purposes	143.831	167.788	159.390	157.487	160.849	160.089
Total, Grants	547.023	763.204	843.658	972.808	1,051.513	1,163.030
Financing items —						
Net borrowing —						
Public corporation securities	27.423	r 36.240	41.296	60.278	r 69.824	100.350
Other general government securities	3.164	4.764	5.611	6.257	18.701	15.490
Advances from the Commonwealth Government (net) —						
For loan works purposes	52.732	65.366	68.473	71.607	70.275	57.694
Other	60.567	51.020	48.136	55.664	42.282	20.249
Net receipts of private trust funds	10.983	r 18.740	r 25.868	26.704	r 18.304	29.640
Reduction in cash and bank balances	26.792	—115.304	—34.041	—12.933	12.744	35.704
Reduction in security holdings	4.195	—12.533	—18.395	—32.615	—23.525	—42.000
Other funds available —						
Depreciation allowances	27.293	30.080	32.661	r 42.055	r 45.844	53.837
Other	4.588	r 49.296	r 65.667	r 37.379	r 57.837	33.703
Total, Financing items	217.737	r 127.669	r 235.276	r 254.396	r 312.286	304.667
TOTAL FUNDS AVAILABLE	1,062.793	r 1,268,960	r 1,488,386	r 1,694,318	r 1,871,083	2,048.694

In the previous table, it will be seen that the main components of the receipts of Western Australian State Authorities are taxation, grants from the Commonwealth Government, and borrowing and financing transactions. Further details of taxation collections by State Authorities and local government authorities are given later in this Part.

STATE AUTHORITIES: OUTLAY ACCORDING TO ECONOMIC TYPE (\$'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Final consumption expenditure —						
General public services —						
General administration n.e.c.	32,195	35,618	r 37,841	r 50,168	58,011	70,792
Law, order and public safety	56,042	69,698	84,217	r 97,108	r 109,459	125,728
Education	233,890	299,230	362,026	406,007	r 448,126	504,960
Health	143,255	215,357	263,656	r 297,634	r 321,985	362,344
Social security and welfare	11,437	r 12,572	r 14,712	r 14,851	r 17,191	19,397
Housing and community amenities	1,869	3,538	2,988	r 3,368	r 2,582	4,808
Recreation and related cultural services	6,889	8,737	11,249	r 13,241	r 20,586	24,779
Economic services —						
General administration, regulation and research	8,040	9,497	10,257	12,607	12,439	15,889
Agriculture, forestry and fishing —						
Soil, water and forest resources management	957	2,510	1,245	68	147	—187
Services to agricultural and pastoral industries and to fisheries	17,888	21,038	23,623	29,389	r 31,366	36,412
Mining, manufacturing and construction	8,858	10,349	10,911	12,894	12,605	13,383
Electricity, gas and water supply services	2,804	4,219	4,737	4,616	5,694	5,119
Transport and communication	2,415	2,307	2,617	2,108	2,374	1,688
Other economic services	6,889	r 6,814	7,874	r 14,676	r 15,331	13,323
Other purposes	181	306	255	794	790	721
Total	533,609	r 701,790	r 838,208	r 959,529	r 1,058,686	1,199,156
Gross capital formation —						
Increase in stocks	12,640	6,304	1,676	321	6,434	19,986
Expenditure on new fixed assets —						
General public services —						
General administration n.e.c.	3,844	7,428	7,099	7,308	7,615	11,292
Law, order and public safety	5,906	5,606	8,023	13,313	16,661	19,282
Education	52,345	53,477	51,082	63,103	62,927	47,813
Health	30,983	44,229	45,911	45,172	54,224	56,845
Social security and welfare	2,107	1,738	1,821	1,094	1,011	1,150
Housing and community amenities —						
Housing	14,430	17,890	41,590	r 54,188	r 38,720	35,414
Community and regional development	1,593	1,483	1,088	3,369	1,236	1,294
Protection of the environment	34,854	36,727	40,624	41,505	39,504	34,660
Recreation and related cultural services	1,274	1,937	2,581	5,318	5,388	5,532
Economic services —						
General administration, regulation and research	—	—	12	4	54	249
Agriculture, forestry and fishing —						
Soil and water resources management	1,610	1,616	1,924	1,133	7,741	4,112
Forest resources management	8,303	9,454	14,076	17,018	19,790	23,202
Services to agricultural and pastoral industries and to fisheries	2,199	1,618	1,960	2,372	3,506	3,504
Mining, manufacturing and construction	1,170	294	3,745	2,318	3,263	4,067
Electricity, gas and water supply services —						
Electricity and gas	50,676	46,649	65,232	84,118	111,328	129,370
Water	27,208	34,453	40,166	43,363	44,754	39,141
Transport and communication —						
Rail transport	16,248	23,261	22,688	15,279	r 19,301	27,655
Sea transport	13,286	19,513	10,304	12,861	16,776	6,716
Road transport	55,092	61,792	74,758	79,343	94,140	110,981
Urban transit	3,222	2,039	4,452	4,441	2,258	4,093
Other economic services	2,238	4,317	2,047	735	1,532	1,352
Other purposes	—	—	—	1,110	2,000	706
Total, Expenditure on new fixed assets	328,588	375,521	441,183	r 498,465	r 553,729	568,430
Expenditure on existing assets (net)	18,956	4,238	1,142	—2,644	—1,942	4,887
Total, Gross capital formation	360,184	386,063	444,001	r 496,142	r 558,221	593,303
Transfer payments —						
Interest	91,189	106,139	125,103	146,058	160,534	167,358
Transfers to persons	18,190	18,536	20,722	26,493	25,285	27,344
Subsidies	3,812	3,094	3,001	3,708	4,232	4,722
Grants for private capital purposes	3,192	3,352	2,265	3,320	3,323	3,058
Grants to local government authorities	29,680	33,729	40,887	42,454	47,551	54,646
Total	146,063	164,850	191,978	222,033	240,925	257,128

STATE AUTHORITIES: OUTLAY ACCORDING TO ECONOMIC TYPE — *continued*
(\$'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Net advances —						
To the private sector	24,734	17,825	17,357	18,829	15,483	828
To public financial enterprises	—17	11	—158	—65	—16	—1,212
To local government authorities	—1,780	—1,579	—3,000	—2,150	—2,216	—509
Total	22,937	16,257	14,199	16,614	13,251	—893
GRAND TOTAL	1,062,793	r 1,268,960	r 1,488,386	r 1,694,318	r 1,871,083	2,048,694
Current	679,672	r 866,640	r 1,030,186	r 1,181,562	r 1,299,611	1,456,284
Capital	383,121	402,320	458,200	r 512,756	r 571,472	592,410

The previous table shows the outlay by Western Australian State Authorities classified by economic type of transaction. The principal categories of the classification are Final consumption expenditure, Gross capital formation, Transfer payments, and Financing items. (Details of Financing items appear under this heading in the preceding table and under *Net advances* in the following table.) Over the six-years 1974-75 to 1979-80, the total outlay by State Authorities increased from \$1,062,793,000 to \$2,048,694,000, Final consumption expenditure amounting to \$1,199,156,000 in 1979-80.

Final consumption expenditure refers to expenditure by public authorities (other than those classified as public enterprises) which does not result in the creation of fixed tangible assets or in the acquisition of land, buildings or secondhand goods. It comprises expenditure on wages, salaries and supplements, and on goods and services other than fixed assets and stock. Fees, etc. charged by general government bodies for goods sold and services rendered are offset against purchases. Net expenditure overseas by general government bodies and purchases from public enterprises are included. All expenditure on defence is classified as Final consumption expenditure.

Gross capital formation refers to expenditure on new fixed assets whether for additions or replacements, including wages and salaries paid in connection with capital works. Expenditure on new fixed assets for defence purposes is excluded. Expenditure on houses and flats is estimated by deducting the cost of previously-rented dwellings sold to the private sector from the estimated expenditure on construction of dwellings for rental. (The sales value of these previously-rented dwellings is included in private capital expenditure.) Because it has not been possible to make a satisfactory dissection, all expenditure on roads, including maintenance, is classified as capital.

Transfer payments include such items as interest payments on public loans, cash benefits to persons (i.e. current transfers to persons from general government in return for which no services are rendered or goods supplied), subsidies paid by public authorities to enterprises, grants to meet part of the cost of private capital expenditure, and grants to local government authorities.

Financing items relate to changes in financial assets and liabilities, and include transactions in securities of all types, borrowing and lending (including repayable advances made by public authorities to other public authorities), trade credit of public trading enterprises, and changes in cash balances.

Public Debt

Under the Financial Agreement of 1927 (as amended) all debt of the Commonwealth and State Governments, with certain minor exceptions, is represented by Commonwealth Government Securities. The information in the following table is derived from the Budget Paper *Government Securities on Issue* published by the Commonwealth Government. The figures do not include government debt not evidenced by the issue of securities, or the debt of other bodies guaranteed by Government.

SECURITIES ISSUED ON BEHALF OF STATE GOVERNMENT

Item		At 30 June —					
		1975	1976	1977	1978	1979	1980
Securities on issue	\$'000	£ 1,121,638	£ 1,090,467	£ 1,160,820	1,237,336	1,307,306	1,360,726
Per head of population	\$	999	952	970	1,010	1,051	1,070
Annual interest liability (Australian currency equivalent)	\$'000	71,463	77,869	87,406	97,817	104,910	112,798
Per head of population	\$	64	68	73	80	84	89

In the table Public Corporations: Debt, *debt* refers to liabilities with an original maturity of twelve months or more incurred in respect of loans and advances received (other than by way of bank overdraft), *less* repayments and redemptions. Current liabilities, such as interest accrued, trade creditors and amounts held in trust are excluded. The figures relate to the debt of those public corporations having power to borrow funds other than from Government.

PUBLIC CORPORATIONS: DEBT
(\$'000)

Item	At 30 June —					
	1975	1976	1977	1978	1979	1980
Advances from public authorities	619,606	687,352	760,247	831,712	878,022	916,039
Loans	360,425	399,731	423,386	485,721	558,401	618,689
Other indebtedness	7,753	6,565	9,785	17,576	30,786	74,918
Debt outstanding	987,784	1,093,648	1,193,418	1,335,009	1,467,209	1,609,646

The principal governmental bodies whose debt is included in the above table are those concerned with energy supply, harbour services, housing, metropolitan region planning, transport, water supply and sewerage services.

Figures in both tables are on a gross borrowing basis as they include all transactions associated with borrowing by one level of government on behalf of another, and borrowing between levels of government and between public authorities.

LOCAL GOVERNMENT FINANCE

The financial powers of local government authorities in Western Australia are derived principally from the *Local Government Act 1960-1981*, the main provisions of which are outlined in Chapter III — *Constitution and Government*.

Receipts and Payments

The following table summarises the receipts and payments (including loan transactions) of local government authorities for the years 1975-76 to 1979-80. Amounts have been shown on a gross basis wherever practicable.

SUMMARY OF LOCAL GOVERNMENT RECEIPTS AND PAYMENTS
(\$'000)

Item	1975-76	1976-77	1977-78	1978-79	1979-80
Receipts —					
Rates	62,439	69,961	79,813	89,765	100,074
Fees and fines	2,232	2,680	3,132	3,280	3,639
Government grants	38,174	22,755	31,149	36,283	39,597
Personal income tax entitlement	..	13,162	15,524	16,848	20,820
Loans raised (a)	28,106	32,629	35,052	37,139	40,421
Reimbursements —					
Road systems (b)	16,075	16,514	10,282	11,076	10,232
Other (c)	5,305	6,614	5,545	5,197	8,987
Other income	32,481	41,498	56,002	61,206	64,879
Total Receipts	184,813	205,813	236,499	260,794	288,649

SUMMARY OF LOCAL GOVERNMENT RECEIPTS AND PAYMENTS — *continued*
(\$'000)

Item	1975-76	1976-77	1977-78	1978-79	1979-80
Payments —					
General public services	28,520	32,021	37,226	42,173	44,346
Education	755	540	448	567	416
Health	3,902	4,645	4,454	5,443	5,518
Welfare	1,794	1,813	3,042	2,511	4,109
Housing and community amenities	20,484	28,149	37,840	33,139	41,443
Recreation and related cultural services	35,477	36,640	41,506	51,761	52,879
Economic services —					
Road systems	60,460	66,019	72,547	84,333	90,830
Other	6,013	6,969	6,091	6,157	7,225
Other purposes —					
Debt redemption	9,764	11,079	12,808	14,506	16,566
Interest —					
On loans	9,714	11,999	14,883	18,410	21,193
On overdraft	539	560			
Loans raised on behalf of State Government (a)	2,583	3,537	1,960	3,989	4,925
Total. Payments	180,005	203,971	232,806	262,988	289,450
Comprising: Recurrent payments	68,539	81,470	102,480	133,110	155,266
Capital payments	111,466	122,501	130,326	129,878	134,184

(a) Includes loans raised on behalf of State Government authorities: see footnote (d). (b) Mainly reimbursements from the Main Roads Department for work performed on its behalf and from private developers for sub-divisional roads. (c) Includes debt charges in respect of loans raised on behalf of State Government authorities: see footnote (d). (d) In order to facilitate or expedite the performance of certain public works (e.g. water supply and sewerage services) it is sometimes expedient for local government authorities to raise loans on behalf of State Government authorities for such purposes.

Further details relating to local government finance in Western Australia are contained in the publication *Local Government* (Catalogue No. 1303.5), issued by this Office. A summary of statistics for other States may be found in the publication *Public Authority Finance — State and Local Authorities* (Catalogue No. 5504.0), issued by the Australian Statistician, Canberra.

Loan Transactions

Under the provisions of the local government legislation, local government authorities are constituted as corporate bodies and are authorised to raise loans for works and undertakings and for the liquidation of existing loan debts. The conditions imposed by the *Local Government Act 1960-1981* in relation to loan raisings, the levying of loan rates, the expenditure of loan moneys and the repayment of loans are summarised in the section *The Local Government System* in Chapter III under the heading *Financial Provisions*.

Loans are raised mainly from banks, insurance companies and superannuation funds. The State Government exercises a measure of supervision over the loan transactions of local government authorities and, where a loan is repayable in full at maturity, maintains the necessary sinking fund at the Treasury.

Loan receipts and payments of local government authorities in the financial years 1975-76 to 1979-80 are included in the table above.

The following table shows the aggregate debt outstanding at 30 June of each year during the period from 1975 to 1980 in respect of all local authorities constituted under the Local Government Act. Figures are on a gross borrowing basis as they include all transactions associated with borrowing by one level of government on behalf of another, and borrowing between levels of government.

LOCAL AUTHORITIES: DEBT
(\$'000)

Item	At 30 June —					
	1975	1976	1977	1978	1979	1980
Advances from public authorities	945	1,022	722	665	628	540
Loans	127,553	145,580	166,034	188,550	213,399	236,592
Other indebtedness	266	223	42	8	43	32
Debt outstanding	128,764	146,825	166,798	189,223	214,070	237,164

TAXATION

Commonwealth Government Taxation

The taxes levied in Western Australia by the Commonwealth Government are listed in the table *Commonwealth Government Taxation, Net Collections in Western Australia* which appears later in this Part.

INCOME TAX ASSESSMENTS — INDIVIDUALS (a): WESTERN AUSTRALIA
INCOME YEAR 1978-79 (ASSESSMENT YEAR 1979-80)

Grade of taxable income	Number of taxpayers	Taxable income	Average per taxpayer	Net tax	Average per taxpayer
\$		\$'000	\$	\$'000	\$
Under 5,000	53,607	228,059	4,254	10,854	202
5,000 — 5,999	40,369	222,051	5,501	21,036	521
6,000 — 6,999	39,459	256,320	6,496	32,608	826
7,000 — 7,999	40,980	307,937	7,514	46,857	1,143
8,000 — 8,999	50,409	428,385	8,498	73,162	1,451
9,000 — 9,999	47,404	450,073	9,494	82,989	1,751
10,000 — 10,999	42,976	450,619	10,485	87,945	2,046
11,000 — 11,999	35,183	403,962	11,482	82,943	2,357
12,000 — 12,999	28,258	352,764	12,484	75,082	2,657
13,000 — 13,999	23,408	315,690	13,486	69,387	2,964
14,000 — 14,999	18,877	273,307	14,478	61,635	3,265
15,000 — 15,999	15,068	233,413	15,491	54,239	3,600
16,000 — 17,999	21,711	366,671	16,889	88,913	4,095
18,000 — 19,999	11,690	221,045	18,909	57,956	4,958
20,000 — 21,999	7,188	150,303	20,910	42,127	5,861
22,000 — 23,999	4,205	96,366	22,917	28,539	6,787
24,000 — 25,999	2,623	65,314	24,900	20,175	7,692
26,000 — 27,999	1,723	46,434	26,950	14,896	8,645
28,000 — 29,999	1,165	33,695	28,923	11,171	9,589
30,000 — 31,999	1,009	31,250	30,971	10,586	10,492
32,000 — 39,999	1,953	68,593	35,122	24,897	12,748
40,000 — 49,999	753	33,153	44,028	13,670	18,154
50,000 — 99,999					
100,000 and over	781	57,634	73,795	28,320	36,261
Total	490,799	5,093,040	10,377	1,039,985	2,119

(a) With certain exceptions, an individual was liable to pay tax on income derived in 1978-79 only if the taxable income exceeded \$3,893.

COMMONWEALTH GOVERNMENT TAXATION (a)
NET COLLECTIONS IN WESTERN AUSTRALIA (\$'000)

Tax, duty, charge or levy	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Income taxes —						
Individuals (b)	589,873	711,869	866,736	972,994	986,432	1,160,617
Companies (c)	109,285	135,467	144,652	149,692	132,775	138,661
Dividend (withholding tax) (d)	1,029	1,158	1,119	3,178	1,241	1,173
Interest (withholding tax) (d)	1,282	1,796	1,622		1,960	2,251
Total income taxes	701,469	850,290	1,014,129	1,125,864	1,122,408	1,302,702
Estate duty	3,737	6,169	5,287	6,503	5,056	2,295
Gift duty	963	1,294	1,314	654	86	51
Customs duties (b)	42,867	46,162	61,942	67,890	71,429	83,539
Excise duties	147,137	186,073	198,758	214,128	254,243	264,891
Sales tax (b)	67,014	86,437	108,314	118,418	108,852	109,596
Primary production taxes	16,864	21,111	23,006	21,413	24,228	29,856
Broadcast listeners' and television viewers' licences	1,369	..	..	..	..	..
Stevedoring industry charge (e)	2,684	5,807	7,646	4,813	2,682	(e)
Pay-roll tax (f)	22	6	7	20	1	—
Departure tax	..	..	..	..	886	1,355
Oil pollution levy	207	182	159	142	155	168
Other taxes, fees, fines, etc.	936	1,045	1,584	2,180	2,347	4,730
Total taxation	985,269	1,204,576	1,422,146	1,562,025	1,592,373	1,799,183

(a) Details of the purposes and rates applicable to the main forms of Commonwealth Government taxation are given in *Official Year Book of Australia*. (b) The amounts shown have been adjusted by offsetting remissions under special circumstances of income tax, customs duties and sales tax. The amount also includes Medibank levy payable from 1 October 1976 to 1 November 1978. (c) Includes payments in the nature of income tax from public enterprises. (d) Tax levied in respect of dividends and interest deemed paid or payable to persons not residing in Australia. (e) From 1979-80 collected through Australian Capital Territory. (f) Discontinued as Commonwealth Government tax September 1971; from that date collected by State Government (see *State and Local Authorities Taxation* below).

Income Tax. Income tax is by far the most important source of Commonwealth revenue from taxation and accounted for 72.4 per cent of all Commonwealth taxation collections in 1979-80. The tax is levied on the income of individuals, companies, partnerships and trusts, and certain private superannuation funds.

Taxable income is the amount remaining after deducting from assessable income all allowable deductions.

It is important to note that, although the figures shown in the preceding table represent the amounts of taxes actually *collected* in Western Australia, they do not necessarily indicate the amounts contributed by the people of the State, as moneys may be collected in one State in respect of goods consumed or assessments made in other States. Further, administrative arrangements for the collection of certain taxes are such that a large proportion of the revenue (or, as in the case of wheat tax, the whole of the revenue) is brought to account in a State other than Western Australia.

State and Local Authorities Taxation

The net amounts collected in Western Australia in the form of State and local authorities taxation in each year from 1974-75 to 1979-80 are shown in the table at the end of this section. Information concerning rates of tax and the relevant legislation is given below.

ESTATE DUTY (PROBATE AND SUCCESSION DUTIES). Following amendments to the *Death Duty Act 1973-1978* and the *Death Duty Assessment Act 1973-1978* no death duty is payable on the estate of a person whose death occurred on or after 1 January 1980.

LAND TAX. The *Land Tax Assessment Act 1976-1980* authorises a tax, with certain specified exemptions, on every owner of land, and the rates of tax are prescribed by the *Land Tax Act 1976*; see table below.

LAND TAX — RATES OF TAX AND AMOUNTS PAYABLE: ASSESSMENT YEAR 1980-81

Unimproved values —		Rate	
Exceeding	Not exceeding	Tax on amount in first column	Tax per dollar on remainder
\$	\$	\$	cents
Nil	5,000	—	0.3
5,000	10,000	15	0.4
10,000	15,000	35	0.5
15,000	20,000	60	0.6
20,000	25,000	90	0.7
25,000	30,000	125	0.8
30,000	35,000	165	0.9
35,000	40,000	210	1.0
40,000	45,000	260	1.1
45,000	50,000	315	1.2
50,000	60,000	375	1.3
60,000	70,000	505	1.4
70,000	80,000	645	1.5
80,000	90,000	795	1.6
90,000	100,000	955	1.8
100,000	110,000	1,135	2.0
110,000	120,000	1,335	2.2
120,000	upwards	1,555	2.4

LOCAL GOVERNMENT RATES. The *Local Government Act 1960-1981* empowers municipalities to impose tax based on a rate in the dollar of the value of all land (except for certain specified exemptions) within the municipality. The method of determining the rate is described in the section *The Local Government System* in Chapter III.

METROPOLITAN REGION IMPROVEMENT TAX. The *Metropolitan Region Improvement Tax Act 1959-1976* authorises a tax, with certain specified exemptions, on every owner of land within the Metropolitan Planning Region. (The Region is coterminous with the Perth Statistical Division; see maps inside back cover.) The rate of tax payable for the assessment year 1980-81 was one quarter of a cent for every dollar of the unimproved value of all land chargeable with the tax.

LIQUOR LICENCES. Licences and permits authorising the holder to sell or supply fermented and spirituous liquors are granted under the provision of the *Liquor Act 1970-1981*. The Act prescribes the fees payable in respect of liquor licences and permits. The several types of licence for which the Act provides are shown in the table *Liquor Licences in Force* in Chapter V, Part 5. Annual licence fees, except in the case of a vigneron's licence, are assessed as a proportion of the gross amount paid for liquor purchased for licensed premises or, in the case of a wholesale licence and a brewer's licence, the gross amount received for liquor sold. The proportion prescribed by the Act is 8 per cent for a tavern licence or a store licence and 7 per cent for other licences. An additional annual fee of \$60 is payable in respect of a wholesale licence and a brewer's licence. The annual fee payable for a vigneron's licence is \$20.

TOBACCO LICENCES. The *Business Franchise (Tobacco) Act 1975-1981* provides for the licensing of persons engaged in tobacco wholesaling and retailing. The fee payable for a wholesale tobacco merchant's licence is \$20 plus 12½ per cent of the value of tobacco sold, other than sales to a wholesaler or a group tobacco licence holder, in the course of intrastate trade during the relevant period. The same conditions apply to a group tobacco licence except that the licence fee is \$20 per member. For a retail tobacconist, the fee is 12½ per cent of the value of tobacco sold, other than tobacco purchased in the course of intrastate trade from a wholesaler, group tobacco licence holder or another retailer.

LOTTERIES PROFITS. The *Lotteries (Control) Act 1954-1972* empowers the Lotteries Commission to conduct lotteries and other similar devices. To maintain comparability with privately operated lotteries in other States (where profits are taxed) and because the main purpose of the Lotteries Commission is to raise revenue for charitable purposes, the whole of the profit is treated as a tax in accordance with the guidelines provided in the document, *A System of National Accounts* published by the United Nations.

TOTALISATOR AGENCY BOARD BETTING TAX. The *Totalisator Agency Board Betting Tax Act 1960-1973* imposes a tax on all moneys paid to the Board in respect of bets made through or with the Board. The rate of tax payable at 30 June 1981 was 6 per cent.

TOTALISATOR DUTY AND LICENCES. The *Totalisator Duty Act 1905-1973* authorises the payment of duty on the takings of totalisators operated by horse-racing clubs and prescribes the rates to be paid. Differential rates apply to totalisators operated within a radius of forty kilometres from the General Post Office, Perth and those situated outside this area. In 1980-81, the principal rates of duty payable in respect of totalisators in the former area were 9 per cent of the gross takings from win and place transactions and 5 per cent of the gross takings from wagering transactions known as 'jack pots', 'quinellas' and 'doubles'; for totalisators outside that area, the rate was 5 per cent for all transactions. The *Totalisator Regulation Act 1911-1973* provides for the licensing of totalisators operated by horse-racing clubs. Licence fees are prescribed by regulation and are payable annually in respect of the calendar year. For the year 1981 the fee payable was \$2 for each \$2,000 (or part of \$2,000) passing through the totalisator.

BOOKMAKERS BETTING TAX. The *Bookmakers Betting Tax Act 1954-1970* provides for a tax on money paid or promised as the consideration for bets made by or on behalf of bookmakers. Rates of tax are prescribed as a proportion of the turnover of a racing year (1 August to 31 July). In respect of turnover of the year ended 31 July 1981 the rates applying to on-course transactions were 2 per cent of amounts up to \$100,000 and 2½ per cent of the remainder. For off-course transactions the rate was 2¼ per cent of amounts up to \$50,000, the rate payable on each additional \$50,000 of turnover increasing by ½ per cent up to \$300,000; on turnover exceeding \$300,000 the rate was 3½ per cent.

STAMP DUTIES. The *Stamp Act 1921-1981* imposes stamp duties and prescribes the rates applying to a great number of transactions relating to a wide range of property, commodities and services.

MOTOR VEHICLE REGISTRATION FEES. The *Road Traffic Act 1974-1981* provides for the registration of vehicles and prescribes the licence fees to be paid in respect of the several classes of vehicles required to be registered. Fees are based on a combination of power unit and tare weight (except for motor cycles, in respect of which the fee is related to engine capacity). For example, the annual licence fee for a motor car with an engine other than a rotary type is \$1.07 per power unit and an additional \$0.86 for each 51 kilograms of the tare weight. The annual licence fee for a motor cycle is \$7.20 where the engine capacity is 250 cubic centimetres or less, and \$9.40 where the engine capacity is more than 250 cubic centimetres. A recording fee of \$4 is payable for the grant or renewal of any licence for a vehicle, and a fee of \$3 for the transfer of any licence.

MOTOR VEHICLE DRIVERS' LICENCES. The *Road Traffic Act 1974-1981* authorises the issue of drivers' licences to persons of a minimum age of seventeen years, specifies other conditions to be satisfied, and prescribes the fees to be paid on application for, and issue or renewal of, a licence. The fee payable on application is \$4, and on issue or on renewal for each period of twelve months, \$10 (or \$1 in the case of a licence to drive a vehicle for the carrying of passengers for reward).

OMNIBUS AND COMMERCIAL VEHICLE LICENCES AND FEES. The *Transport Act 1966-1981* provides for the licensing of public vehicles in the categories of omnibus, commercial goods vehicle, trailer or semi-trailer, and aircraft, as well as ships engaged in the coasting trade. Licence fees are as determined from time to time by the Commissioner of Transport, subject to certain maximum charges prescribed by the Act. In the case of an omnibus, for example, the fee may not exceed 6 per cent of the gross earnings, or \$10 per annum for each unit of the maximum number of passengers which it is licensed to carry, the basis of assessment being that considered by the Commissioner to be the more appropriate.

TAXI CONTROL BOARD LICENCES. The *Taxi-cars (Co-ordination and Control) Act 1963-1980*, under which the Taxi Control Board is constituted, requires that taxi-cars operating in the Metropolitan Traffic Area and other areas as declared shall be licensed, and prescribes maximum fees payable. At 31 December 1980 these fees were \$100 on the issue or annual renewal of a licence where the licence is issued for unrestricted operations in the metropolitan area or, in any other cases, \$60. For the transfer of a licence the fee is a percentage, as determined by the Board, (not exceeding 10 per cent) of the market value of the taxi-car licence at the time of transfer.

ROAD MAINTENANCE CONTRIBUTION. The *Road Maintenance (Contribution) Act 1965-1978* was repealed by the *Acts Amendment and Repeal (Road Maintenance) Act 1979* with effect from 1 July 1979.

PETROLEUM PRODUCTS LICENSING. The *Transport Commission Act 1966-1979* as amended by the *Acts Amendment and Repeal (Road Maintenance) Act 1979* provides for the licensing of persons engaged in wholesaling petroleum products. The fee payable for such a licence for any period up to 30 June 1980 was \$500 plus 0.9 cents for every litre of motor spirit and 3 cents for every litre of diesel fuel wholesaled by the applicant in the period from 1 April 1978 to 31 March 1979. As from 1 July 1980 the fee payable was to be \$500 together with an amount as prescribed for every litre of motor spirit and diesel fuel wholesaled by the applicant in the year ending on the 31st day of March last preceding the date on which the licence comes into force. For fuel wholesaled between 1 April 1979 and 31 March 1981 the prescribed fees for each litre were 1.3 cents for motor spirit and 3 cents for diesel fuel.

MOTOR VEHICLE THIRD PARTY INSURANCE SURCHARGE. The *Motor Vehicle (Third Party Insurance Surcharge) Act 1962-1976* imposes a surcharge on premiums paid in respect of policies of insurance with The Motor Vehicle Insurance Trust. At 31 December 1980 the rate of the surcharge was \$5 per annum.

OFF-ROAD VEHICLE REGISTRATION FEES. The *Control of Vehicles (Off-road areas) Act 1978* provides for the registration of off-road vehicles. At 31 December 1980, the annual fee prescribed for registration of a vehicle under the Act was \$4.

PAY-ROLL TAX. Pay-roll tax, which was formerly levied by the Commonwealth Government has been collected by the States since September 1971. In Western Australia the enabling legislation comprises the *Pay-roll Tax Assessment Act 1971-1981* and the *Pay-roll Tax Act 1971-1974*. The tax is payable by each employer, with certain specified exceptions, on all wages and salaries paid in excess of \$8,500 per month (\$102,000 per annum). The rate of tax prescribed by the *Pay-roll Tax Act 1971-1974* is 5 per cent.

CONTRIBUTIONS FROM INSURANCE COMPANIES TO FIRE BRIGADES. The *Fire Brigades Act 1942-1979* specifies that 75 per cent of the estimated expenditure of the Fire Brigades Board be contributed by insurance companies by way of a compulsory levy which is based on a declared percentage of gross premiums of each insurance company.

OTHER TAXES, FEES, FINES, ETC. consists of payments to public authorities by individuals and households, private non-profit organisations and corporate or quasi-corporate enterprises. Examples are firearm licences; boat registration fees; statutory levies on public corporations comprising the State Energy Commission, Metropolitan Water Supply, Sewerage, and Drainage Board and the Fremantle Port Authority; and judicial fines.

STATE AND LOCAL AUTHORITIES: TAXATION BY TYPE OF TAX
(S'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Estate, gift, probate and succession duties	10.005	11.662	12.758	14.762	15.082	13.035
Property —						
Land tax	10.467	12.090	11.749	14.747	17.634	22.962
Local government rates	49.554	62.439	69.961	r 79.814	89.766	99.064
Metropolitan improvement rates	1.541	1.692	2.188	2.624	3.280	4.078
Other	—	—	182	130	188	161
Total, Property	61.562	76.221	84.080	r 97.315	110.868	126.265
Liquor licences	6.908	9.018	11.177	12.850	14.358	16.258
Tobacco licences	..	3.577	7.549	8.333	8.962	9.681
Gambling —						
Lotteries Commission	3.898	5.529	5.898	6.198	6.168	8.137
Racing —						
Totalisator Agency Board betting tax	7.014	8.141	9.010	10.334	11.226	11.830
Totalisator duty and licences	1.653	2.084	2.219	2.240	2.482	2.579
Bookmakers' betting tax and licences	723	860	1,028	1,105	1,289	1,265
Stamp duty	89	87	90	89	83	75
Total, Gambling	13.377	16.701	18.245	19.966	21.250	23.886
Ownership and operation of motor vehicles —						
Vehicle registration fees and taxes	26.740	32.191	35.963	r 44.928	48.956	45.948
Drivers' licences and fees	2.755	4.798	3.510	3.775	6.242	4.961
Stamp duty on vehicle registration	3.205	4.396	5.507	5.891	6.215	6.324
Road transport taxes —						
Omnibus and commercial vehicle licences and fees	1.280	1,423	1,539	2,032	2,039	2,171
Overload permits	241	264	300	204	190	210
Taxi licence fees	101	73	125	125	105	97
Road maintenance contribution	4,178	4,451	4,617	5,193	5,698	980
Motor vehicle third party insurance surcharge	2,754	2,930	3,170	3,311	3,373	3,674
Petroleum products wholesaler licences and taxes	—	—	—	—	—	16.265
Total, Motor vehicles	41.254	50.526	54.731	r 65.459	72.818	80.630
Pay-roll tax	75.013	91.877	106.229	r 119.155	126.911	136.989
Fire Brigade contributions from insurance companies	7.600	9.280	10.083	12.173	13.801	15.652
Stamp duties n.e.c.	26.741	39.904	49.071	55.067	59.907	71.113
Other taxes, fees, fines, etc.	13.001	16.041	18.900	r 20.847	r 24.694	29.162
GRAND TOTAL	255.461	324.807	r 372.823	r 425.927	r 468.651	522.671

PENSION AND SUPERANNUATION SCHEMES

The Western Australian Government and many local government authorities and public corporations have established pension and superannuation schemes for eligible employees and their dependants, to which both employers and employees contribute. These schemes are operated either through separately constituted funds or through life insurance offices.

The *Superannuation and Family Benefits Act 1938-1981* applies to employees of State Government Departments and some other public authorities. The Act establishes The Superannuation Fund and a Provident Account under the management of a Superannuation Board. Contributions made by the State are paid from the Consolidated Revenue Fund.

In the following table, particulars are given of pension and superannuation schemes established by the State Government, local government authorities, public corporations, the University of Western Australia, Murdoch University, and the Western Australian Institute of Technology. Particulars of the Parliamentary Superannuation Fund and the Coal Mine Workers' Pensions Fund are also included. Separate details are shown for schemes operated through separately constituted funds and for those operated through life insurance offices.

PUBLIC AUTHORITY PENSION AND SUPERANNUATION SCHEMES
(\$'000)

Item	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Separately constituted funds —						
Income —						
Contributions towards premiums by —						
Employees	11.718	14.007	15.893	17.598	19.314	21.235
Employers	12.989	17.188	22.397	28.628	34.347	40.466
Other income	7.074	9.404	12.382	15.414	17.944	22.292
Total	31.781	40.599	50.672	61.640	71.604	83.993
Expenditure —						
Benefits to contributors	17.169	22.609	29.170	36.395	41.432	49.797
Other expenditure	855	376	152	393	516	1,141
Total	18.024	22.986	29,322	36.788	41.948	50.938
Schemes operated through life insurance offices —						
Income —						
Contributions towards premiums by —						
Employees	2.015	2.445	2.958	3.304	3.575	3,964
Employers	2.884	4.001	4.849	5.295	5.644	6.087
Other income	743	1,164	1,907	2,274	5,113	3,654
Total	5.642	7,610	9,714	10.873	14.332	13,705
Expenditure —						
Benefits to contributors	683	1,063	1,796	2,340	4,346	3,085
Other expenditure (including premiums)	4,996	6,715	8,074	9,060	8,139	9,627
Total	5,679	7,778	9,870	11,400	12,485	12,712
Assets of separately constituted funds —						
Cash and deposits —						
Deposits with Treasury	2,215	3,020	6,241	6,103	5,091	7,422
Other deposits and cash	435	688	110	763	134	1,453
Public authority securities —						
Australian Government	163	163	163	180	183	312
Other	68,269	78,481	89,853	99,960	114,421	123,230
Mortgages —						
Housing	1,013	1,214	1,993	5,679	4,146	31,194
Other	3,261	5,112	8,460	11,511	19,935	23,509
Loans to building societies	741	1,057	259	1,000	914	554
Company shares, debentures and notes	4,625	6,244	7,434	6,403	8,470	10,885
Other assets	15,257	17,762	20,902	28,569	37,078	25,506
Total	95,980	113,740	135,416	160,170	190,373	224,064
Less sundry creditors, etc.	551	719	1,066	970	1,517	2,696
Accumulated funds	95,429	113,022	134,350	159,201	188,857	221,368

The *Superannuation, Sick, Death, Insurance, Guarantee and Endowment (Local Governing Bodies' Employees) Funds Act 1947-1975* enables local government authorities to establish funds to provide benefits for their employees. Contributions made by an authority are paid from its ordinary revenue. Although this Act was repealed and replaced by the *Local Government Superannuation Act 1980*, the new superannuation scheme did not come into effect until 1 December 1981.

The *Parliamentary Superannuation Act 1970-1980* establishes a Parliamentary Superannuation Fund to provide superannuation, pensions and other benefits for former Members of the Parliament of Western Australia and their dependants. The fund is financed from contributions paid by members and moneys appropriated from the Consolidated Revenue Fund.

The *Coal Mine Workers (Pensions) Act 1943-1980* establishes a Coal Mine Workers' Pensions Fund to provide pensions and other benefits for persons formerly engaged in coal mining and for their dependants. The Fund is financed from contributions paid by employees and employers and moneys appropriated from the Consolidated Revenue Fund.

Chapter VI—continued

Part 2 — Private Finance

CURRENCY

The power to legislate with respect to currency, coinage and legal tender and the issue of paper money is vested by the Constitution in the Commonwealth Parliament. This power was originally exercised by the Commonwealth Government under the Coinage Act of 1909 and the Australian Notes Act of 1910. These Acts and later amendments were superseded by the *Reserve Bank Act* 1965 and the *Currency Act* 1965 when a decimal currency system was adopted in Australia with effect from 14 February 1966.

Prior to 14 February 1966 the Australian currency was based on the system then in use in the United Kingdom, and therefore had as its unit the pound (£) divided into twenty shillings (s.) each of twelve pence (d.). The *Currency Act* 1965 provided for the adoption of a monetary unit known as the 'dollar', which is divided into 100 minor units, or 'cents'. Coins are in the denominations of 50 cents, 20 cents, 10 cents, 5 cents, 2 cents and 1 cent. The *Reserve Bank Act* 1965 authorises the issue of notes in the denomination of 1 dollar, 2, 5, 10, 20, and 50 dollars, or in any other denomination that the Treasurer determines and notes are currently issued in all of these.

Australian notes are legal tender in Australia to any amount, coins of the denominations of 5, 10, 20 and 50 cents for amounts not exceeding five dollars, and two-cent and one-cent coins for amounts up to and including 20 cents.

Rates of Exchange

The following table shows the average telegraphic transfer selling rates of exchange for Australia on a selection of overseas countries. The figures appearing in the table, which are averages of daily quotations, are based on rates quoted by the Commonwealth Trading Bank of Australia.

OVERSEAS EXCHANGE RATES — TELEGRAPHIC TRANSFER SELLING RATES FOR
AUSTRALIA ON OVERSEAS COUNTRIES: YEAR ENDED JUNE 1981

Country	Currency	Number to A\$1	Country	Currency	Number to A\$1
Austria	Schillings	16.33	Netherlands	Guilders	2.533
Belgium (a) —			New Caledonia	Francs	97.54
Financial rate	Francs	37.85	New Zealand	Dollars	1.226
Convertible rate	Francs	37.32	Norway	Kroner	6.00
Canada	Dollars	1.3641	Pakistan	Rupees	11.27
China, People's Republic of	Renminbi	1.805	Philippine Islands	Pesos	8.637
Denmark	Kroner	7.17	Singapore	Dollars	2.429
Fiji	Dollars	0.932	South Africa	Rands	0.8979
France	Francs	5.401	Spain	Pesetas	92.96
Germany, Federal Republic of	Deutsche Marks	2.312	Sri Lanka	Rupees	19.774
Greece	Drachmae	55.26	Sweden	Kronor	5.134
Hong Kong	Dollars	5.965	Switzerland	Francs	2.098
India	Rupees	9.225	Thailand	Bahts	23.58
Italy	Lire	1,113.0	United Kingdom	Pounds	0.505
Japan	Yen	246.67	United States of America	Dollars	1.1588

(a) The 'convertible' rate applies to trade transactions accompanied by documentation; in respect of other transactions the 'financial' rate applies.

BANKING

The banking system in Western Australia comprises the Commonwealth banking institutions, The Rural and Industries Bank of Western Australia and the private trading banks, summary details of which are given below.

Commonwealth Banking Institutions

Prior to the operation of the Reserve Bank Act and the Commonwealth Banks Act, passed by the Commonwealth Parliament in 1959, the Commonwealth banking institutions were the Commonwealth Bank, the Commonwealth Trading Bank and the Commonwealth Savings Bank. The Commonwealth Bank, in addition to performing the functions of a central bank, controlled the Australian note issue through a Note Issue Department and also provided special banking facilities through the Rural Credits Department, the Mortgage Bank Department and the Industrial Finance Department. The policy of the Banks was determined by a Commonwealth Bank Board.

The *Reserve Bank Act* 1959 repealed the Commonwealth Bank Acts, first of which was passed in 1911, and established the Reserve Bank of Australia under the control of a Reserve Bank Board. The Reserve Bank was constituted as the central bank and took over the Note Issue Department and the Rural Credits Department of the former Commonwealth Bank. The function of the Rural Credits Department is to make available to statutory authorities or co-operative associations of primary producers advances to assist the marketing or processing of primary products.

The *Commonwealth Banks Act* 1959 constituted the Commonwealth Banking Corporation, which came into being on 14 January 1960 as the authority responsible for the operations of the Trading Bank, the Savings Bank and a new Development Bank. The Development Bank was formed basically from the Mortgage Bank Department and the Industrial Finance Department of the Commonwealth Bank, to provide finance and advice to persons to assist them in primary production or in the establishment or development of industrial undertakings, particularly small enterprises.

The Rural and Industries Bank of Western Australia

The Rural and Industries Bank of Western Australia was established by the State Government under the Rural and Industries Bank Act of 1944 to replace the former Agricultural Bank of Western Australia. The Bank consists of a Rural Department and a Government Agency Department, and management is vested in five Commissioners. The Rural Department provides general banking services and, since 1956, has also conducted savings bank business through a Savings Bank Division.

Trading Banks

At 30 June 1981 the trading banks conducting business in Western Australia comprised the Commonwealth Trading Bank of Australia, The Rural and Industries Bank of Western Australia (Rural Department), the Australia and New Zealand Banking Group Limited, the Bank of New South Wales, the Banque Nationale de Paris, The Commercial Bank of Australia Limited, The Commercial Banking Company of Sydney Limited and The National Bank of Australasia Limited.

The operations of trading banks are governed by the *Banking Act* 1959 (Commonwealth) which places them under a degree of control by the central bank, the Reserve Bank of Australia.

The following table shows the averages of total amounts on deposit with the trading banks and of their outstanding advances during each of the years 1975-76 to 1980-81. The figures relate to Western Australian business only and represent the annual average of amounts as at the close of business each Wednesday. The information is prepared from returns furnished under the requirements of the *Banking Act* 1959 by all trading banks except The Rural and Industries Bank of Western Australia, which supplies information by special arrangement.

TRADING BANKS — AVERAGES OF DEPOSITORS' BALANCES AND BANK ADVANCES
(\$'000)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Depositors' balances —						
Commonwealth Government and State Government —						
Fixed	43.517	142.153	156.673	171.242	158.948	141.101
Current —						
Bearing interest	16	1.275	4.056	2.057	2.526	3.302
Not bearing interest	4.930	4.800	2.183	4.251	4.843	6.223
Other than Commonwealth Government and State Government —						
Fixed	512.646	631.435	670.993	773.628	797.802	1,001.193
Current —						
Bearing interest	45.218	43.316	41.059	43.947	55.035	52.470
Not bearing interest	486.026	553.834	573.245	626.729	723.647	821.798
Total	1,092.350	1,376.813	1,448.208	1,621.852	1,742.801	2,026.087
Loans, advances and bills discounted (a)	791.376	927.708	1,163.207	1,368.657	1,678.121	1,942.691
Ratio of loans, advances, etc. to total balances (per cent)	72.4	67.4	80.3	84.4	96.3	95.9

(a) Excludes loans to authorised dealers in the short-term money market.

In the following table, which relates to Western Australian business only, the average amount on deposit with each trading bank and the average of its outstanding advances during the month of June 1981 are shown, together with the number of branches and agencies of each bank at 30 June 1981.

TRADING BANKS — BRANCHES, AGENCIES, DEPOSITS AND ADVANCES: JUNE 1981

Bank	Number of branches (a)	Number of agencies (a)	Depositors' balances (b)			Loans, advances, and bills discounted (b) (c)
			Not bearing interest	Bearing interest	Total	
			\$'000	\$'000	\$'000	\$'000
Commonwealth Trading Bank of Australia	87	32	147,010	193,836	340,845	338,667
The Rural and Industries Bank of Western Australia (Rural Department)	84	20	125,435	413,101	538,535	523,908
Other trading banks —						
Australia and New Zealand Banking Group Limited	74	17	133,199	169,683	302,881	289,560
Bank of New South Wales	131	25	211,511	285,444	496,955	451,576
Banque Nationale de Paris	1	—	1,976	17,721	19,697	14,152
The Commercial Bank of Australia Limited	41	3	53,783	68,363	122,146	114,212
The Commercial Banking Company of Sydney Limited	9	—	10,686	15,833	26,519	20,350
The National Bank of Australasia Limited	84	17	136,774	152,143	288,917	298,134
Total, Other trading banks	340	62	547,929	709,187	1,257,115	1,187,984
TOTAL, ALL TRADING BANKS	511	114	820,371	1,316,122	2,136,494	2,050,557

(a) At 30 June. (b) Averages based on amounts at close of business each Wednesday. (c) Excludes loans to authorised dealers in the short-term money market.

In July 1981 the outstanding advances of the trading banks, excluding The Rural and Industries Bank of Western Australia and the Banque Nationale de Paris, amounted in total to \$1,561.2 million. Business advances represented \$911.5 million, personal advances \$631.2 million, advances to non-profit organisations \$8.4 million, and to public authorities other than the Commonwealth Government and the State Government \$10.0 million. Business advances were mainly for rural industry (\$308.8 million), for retail and wholesale trade (\$153.0 million) and for mining (\$64.6 million). Of the personal advances, loans for the building or purchasing of homes accounted for \$78.3 million.

The following table contains particulars of the average weekly debits to customers' accounts in each year from 1975-76 to 1980-81 and in each quarter of those years. The figures represent the total of all cheques and charges debited to accounts of customers of all trading banks and, in addition, the Rural Credits Department of the Reserve Bank of Australia and the Commonwealth Development Bank of Australia. Debits to Commonwealth Government and State Government accounts at city branches are excluded as they are subject to abnormal influences. The figures are derived by averaging the debits made during weeks ended on Wednesdays during the several periods shown.

TRADING BANKS						
AVERAGE WEEKLY DEBITS TO CUSTOMERS' ACCOUNTS (a)						
Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
WEEKLY AVERAGE (\$ million)						
Average for quarter ended —						
September	614.8	731.6	890.5	1,155.2	r 1,354.3	1,649.4
December	675.4	809.1	979.0	1,020.9	1,437.0	1,849.7
March	688.4	842.8	991.7	1,164.2	1,530.6	1,846.7
June	741.6	874.2	1,042.3	1,266.7	1,531.3	1,959.3
Average for year	680.0	814.4	975.9	1,151.8	r 1,432.3	1,826.3
PER HEAD OF MEAN POPULATION (dollars)						
Average for quarter ended —						
September	546.0	623.7	741.8	943.2	1,087.5	1,290.1
December	595.8	685.7	810.8	830.4	1,148.8	1,439.4
March	602.4	710.0	816.8	943.4	1,218.3	1,428.9
June	646.8	732.4	854.6	1,022.2	1,213.4	1,508.2
Average for year	597.6	687.2	806.2	935.0	1,167.3	1,420.7

(a) Excludes debits to Commonwealth Government and State Government accounts at city branches.

Bank Charges. These charges, comprising three separate elements, are calculated quarterly and debited as one composite item. In addition to a basic maintenance fee, there is a ledger activity fee, and a collection fee on cheques deposited in excess of twenty per quarter. Rebates are allowable on ledger activity fees where credit balances are maintained at the level of \$1,000 or more throughout the quarterly period.

Savings Banks

At 31 December 1981 savings banks operating in Western Australia comprised the Commonwealth Savings Bank of Australia, The Rural and Industries Bank of Western Australia (Savings Bank Division), the Australia and New Zealand Savings Bank Limited, the Bank of New South Wales Savings Bank Limited, The Commercial Savings Bank of Australia Limited, the C.B.C. Savings Bank Limited and The National Bank Savings Bank Limited.

Individual depositors may not operate on their savings bank accounts by cheque, but cheque accounts are generally available to non-profit organisations such as friendly, co-operative and charitable societies. Interest is paid on deposits with savings banks and no charge is made for the keeping of accounts. A school savings bank service is provided and its operations, except for the number of accounts open at the end of each year, are included in the figures shown in the following table which shows savings bank transactions for each of the years 1975-76 to 1980-81.

SAVINGS BANK TRANSACTIONS

Particulars		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Deposits (a)	\$'000	1,895,449	2,056,604	2,248,260	2,447,263	2,744,802	3,284,206
Withdrawals (a)	\$'000	1,818,297	2,040,154	2,210,319	2,415,916	2,721,126	3,214,273
Excess of deposits over withdrawals	\$'000	77,152	16,450	37,941	31,347	23,676	69,933
Interest added to accounts	\$'000	41,114	46,405	50,021	53,770	58,879	73,654
Accounts open at end of year (b)	No.	1,443,883	1,466,200	1,511,092	1,539,416	1,579,722	1,647,837
Depositors' balances at end of year —							
Total	\$'000	897,693	960,548	1,048,510	1,133,627	1,216,182	1,360,315
Average per operative account	\$	622	655	694	736	770	826
Average per head of population	\$	800	812	861	920	970	1,058

(a) Includes inter-branch transfers but excludes transfers from and to other States. (b) Excluding inoperative accounts (i.e. accounts of less than \$2 which have not been operated on for more than two years).

The following table, which relates to Western Australian business only, shows the number of branches and agencies of each of the savings banks at 30 June 1981. The amount of depositors' balances held by each bank at the end of June 1981 is also shown. This information, together with similar particulars for each of the other Australian States, is published monthly in the *Commonwealth of Australia Gazette*, and is prepared from returns furnished under the requirements of the *Banking Act* 1959 by all savings banks except The Rural and Industries Bank of Western Australia (Savings Bank Division), which supplies information by special arrangement.

SAVINGS BANKS — BRANCHES, AGENCIES AND DEPOSITS
JUNE 1981

Bank	Number of branches (a)	Number of agencies (a)	Depositors' balances (b) \$'000
Commonwealth Savings Bank of Australia	95	618	510,495
The Rural and Industries Bank of Western Australia (Savings Bank Division)	84	534	307,321
Other savings banks —			
Australia and New Zealand Savings Bank Limited	74	164	128,553
Bank of New South Wales Savings Bank Limited	131	448	244,282
The Commercial Savings Bank of Australia Limited	41	27	47,933
C.B.C. Savings Bank Limited	9	4	10,357
The National Bank Savings Bank Limited	84	52	111,374
Total. Other savings banks	339	695	542,499
TOTAL. ALL SAVINGS BANKS	518	1,847	1,360,315

(a) At 30 June. (b) Particulars for the Commonwealth Savings Bank and The Rural and Industries Bank of Western Australia (Savings Bank Division) relate to 30 June, and those for other savings banks to the last Wednesday in June.

In December 1969 approval was given by the Reserve Bank of Australia to a proposal for the establishment of a new type of savings bank account on which interest could be paid at rates above the general deposit rate paid by savings banks. The holder of such an account is required to comply with certain conditions relating to its operation, these conditions varying between banks. Notice is required before a withdrawal may be made, the account must have, at all times, a specified minimum balance and transactions are in minimum amounts of \$100. The maximum rate of interest payable on these 'investment' accounts at 30 June 1981 was 10.5 per cent per annum.

Bank Interest Rates

The following table shows bank interest rates current at 30 June 1981, the dates from which they became operative, and the rates which were applicable prior to those dates, for both loans and deposits.

BANK INTEREST RATES AT 30 JUNE 1981

Particulars	Rate per annum per cent	Date from which operative	Previous rate per annum per cent
LENDING RATES			
Trading banks —			
Overdraft —			
Less than \$100,000 (a)	12.50	December — 1980	10.50
\$100,000 and over (b)		February — 1972	8.25
Unsecured personal loans (a) (c)	8.75	December — 1980	7.75
Commonwealth Development Bank of Australia —			
Rural loans (d)	12.00	April — 1981	11.50
Industrial (d)	12.00	April — 1981	11.50
Reserve Bank of Australia, Rural Credits Department	13.25-13.75	June — 1981	12.25-12.75
Savings banks —			
Housing loans to individuals for owner occupation (e)	11.50	January — 1981	10.50-11.50
Other loans —			
Less than \$100,000 (a)	12.50	December — 1980	10.50
\$100,000 and over (b)		March — 1972	7.75
DEPOSIT RATES			
Trading banks —			
Fixed deposits of less than \$50,000 —			
3 months and less than 6 months	10.50-12.25	April — 1981	10.50-11.75
6 months and less than 2 years	11.00-12.25	April — 1981	11.00-12.00
2 years and less than 4 years	11.25-12.00	March — 1981	10.50-11.75
Fixed deposits of \$50,000 and over (b) —			
3 months to 4 years	(f)	December — 1980	10.00
Certificates of deposit of \$50,000 and over (b) —			
3 months to 4 years	(f)	September — 1974	6.50
Savings banks —			
Ordinary accounts (g) —			
\$4,000 and under	3.75-5.00	December — 1978	3.75-5.25
Over \$4,000	5.00-6.25	April — 1978	6.00-6.50
Investment accounts (h)	10.00-10.50	January — 1981	9.00-10.50

(a) Maximum rate. (b) Actual rates are a matter for negotiation between banks and their customers. (c) Flat rate. (d) Basic rate. (e) Standard range of rates on new loans. (f) Not subject to maximum rate. (g) The lower rate shown has predominated in the case of most banks. (h) Subject to special notice and minimum balance requirements.

INSURANCE

General Insurance

General insurance is available to the public in Western Australia from a number of companies and, in some fields, from the State Government Insurance Office. There is also a Motor Vehicle Insurance Trust whose activities are confined to motor vehicle third party insurance.

The *Insurance Act 1973* (Commonwealth) established a comprehensive system of supervision of general insurance business throughout Australia. The Act prescribes minimum standards of financial soundness and authorises the investigation of any insurer who fails to meet the required standards or who appears to be likely to fall below those standards. The Act provides for the appointment of an Insurance Commissioner who is responsible, subject to any directions of the Treasurer, for the administration of the legislation.

The State Government Insurance Office covers fire, marine and general insurance risks for State Government instrumentalities and semi-government and local government authorities. It also conducts some classes of insurance business for the general public, the principal transactions being employers' liability (workers' compensation) and comprehensive motor vehicle insurance. By authority of amendments to the State Government Insurance Office Act in 1954 and 1958 the Office engages in personal accident insurance in respect of school children and students under a policy which indemnifies the parent or guardian against the cost of medical and surgical treatment and funeral and other expenses.

The following table gives details of general insurance transactions during each of the years from 1975-76 to 1980-81. The amounts shown as 'Premiums' represent the full amount receivable in respect of policies issued or renewed during the year, less stamp duty, returns, rebates and bonuses paid or credited to policy holders during the year. They are not adjusted to provide for premiums unearned at the end of the year and consequently the amounts differ from 'earned premium income' appropriate to the year. The amounts shown as 'Claims' include provision for outstanding claims and represent claims or losses incurred during the year. Salvage and other amounts recoverable have been deducted. The transactions of The Motor Vehicle Insurance Trust are included and they are also shown separately in the table in the section *Motor Vehicle Third Party Insurance*.

GENERAL INSURANCE (a)
(\$'000)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Premiums —						
Fire	17,387	18,398	18,375	17,286	18,640	21,669
Crop	4,809	4,392	2,977	3,811	4,585	4,362
Houseowners' and householders'	14,487	15,230	18,771	20,108	22,926	27,240
Marine	4,938	6,136	6,221	7,183	8,355	9,053
Motor vehicle comprehensive	43,100	54,629	64,065	68,809	73,404	80,206
Compulsory third party	17,266	25,751	27,211	35,122	39,392	55,114
Employers' liability	45,627	61,248	73,199	72,375	69,278	72,135
Public liability	2,554	3,593	3,957	4,299	4,894	6,086
Personal accident	5,202	6,343	5,163	r 5,440	r 5,892	6,233
Other	12,129	14,811	18,103	20,454	r 23,413	26,280
Total, Premiums	167,499	210,531	238,042	r 254,887	r 270,779	308,378
Claims —						
Fire	12,007	4,395	9,291	13,165	13,102	15,380
Crop	1,223	1,464	3,248	3,025	4,321	1,326
Houseowners' and householders'	7,138	6,919	11,875	15,544	14,420	15,719
Marine	3,704	4,097	3,296	5,613	6,344	6,164
Motor vehicle comprehensive	27,443	34,080	44,098	49,574	49,932	54,821
Compulsory third party	16,354	31,512	40,657	53,261	65,049	98,239
Employers' liability	45,517	50,428	63,354	46,172	44,315	72,874
Public liability	1,031	1,606	1,817	1,899	2,765	3,539
Personal accident	1,887	2,302	2,050	r 2,424	r 3,109	3,174
Other	7,475	7,273	7,890	9,668	11,214	13,333
Total, Claims	123,779	144,076	187,576	r 200,345	r 214,571	284,569

(a) From 1977-78 premium and claim details for brokers have been excluded. Transactions of The Motor Vehicle Insurance Trust and the State Government Insurance Office are included.

Life Insurance

Life insurance business throughout Australia is regulated by the *Life Insurance Act 1945* (Commonwealth), which requires companies to be registered by the Life Insurance Commissioner appointed under the Act. The purpose of the Act, which supersedes State legislation, is to place life insurance business on a uniform basis throughout the Commonwealth and to afford protection to policy holders.

In terms of total sums insured, life insurance policies relate predominantly to ordinary endowment or whole-of-life insurance and superannuation, although an appreciable volume of industrial business is also undertaken.

Details of policies, sums insured and annual premiums for each class of business are given in the following table for the years 1975-76 to 1980-81.

LIFE INSURANCE

Year	New policies issued			Policies discontinued or reduced			Policies, etc. existing at end of year		
	Policies	Sum insured	Annual premiums	Policies	Sum insured	Annual premiums	Policies	Sum insured	Annual premiums
	Number	\$m	\$m	Number	\$m	\$m	Number	\$m	\$m
ORDINARY AND INDUSTRIAL BUSINESS									
1975-76	52,955	730.2	10.2	52,423	264.1	5.5	670,019	3,782.4	71.2
1976-77	52,969	897.0	11.0	55,278	362.6	6.7	667,710	4,316.7	75.5
1977-78	51,772	1,006.6	10.8	62,406	438.9	7.7	656,632	4,883.5	78.6
1978-79	50,850	1,137.8	11.6	67,030	471.9	9.3	641,111	5,583.8	81.3
1979-80	47,526	1,243.6	12.6	73,942	772.6	10.5	617,297	6,051.3	83.7
1980-81	37,837	1,113.8	12.3	71,963	837.7	10.6	583,177	6,325.0	85.3
SUPERANNUATION BUSINESS									
1975-76	11,007	358.8	10.1	5,228	110.0	3.1	55,353	1,013.4	29.5
1976-77	10,392	385.4	10.2	4,991	148.4	3.7	60,754	1,250.3	36.0
1977-78	10,799	634.4	14.8	5,135	190.5	5.3	66,371	1,694.2	45.6
1978-79	9,839	458.3	10.9	5,380	234.8	6.3	70,843	1,916.4	50.0
1979-80	11,718	602.3	14.4	9,588	325.6	8.5	73,035	2,219.2	56.0
1980-81	15,430	977.5	19.7	8,342	322.5	8.0	80,064	2,851.7	67.7
ORDINARY, INDUSTRIAL AND SUPERANNUATION BUSINESS									
1975-76	63,962	1,088.9	20.3	57,651	374.2	8.6	725,372	4,795.8	100.7
1976-77	63,361	1,282.3	21.2	60,269	511.1	10.3	728,464	5,567.0	111.5
1977-78	62,571	1,641.0	25.6	67,541	629.4	13.0	723,003	6,577.7	124.2
1978-79	60,689	1,596.1	22.5	72,410	706.7	15.6	711,954	7,500.2	131.3
1979-80	59,244	1,845.9	27.0	83,530	1,098.2	19.0	690,332	8,270.5	139.7
1980-81	53,267	2,091.3	32.0	80,305	1,160.2	18.6	663,241	9,176.7	153.0

Motor Vehicle Third Party Insurance

Third party insurance in connection with motor vehicle accidents became compulsory on 1 July 1944 under the provisions of the Motor Vehicle (Third Party Insurance) Act of 1943. The Motor Vehicle Insurance Trust was established by an amendment to the Act in 1948 and comprises the general manager of the State Government Insurance Office and four other members nominated by participating approved insurers other than the State Government Insurance Office.

THE MOTOR VEHICLE INSURANCE TRUST
(\$'000)

Revenue and expenditure	Pool (a) for the year —					
	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Revenue —						
Premiums	17,226	25,766	27,197	35,118	39,370	55,109
Interest received	2,909	7,739	6,888	7,161	7,659	4,362
Total. Revenue	20,135	33,505	34,085	42,279	47,029	59,471
Expenditure —						
Claims (b)	29,784	33,212	50,280	56,649	65,067	(c) 67,943
Commission	72	76	78	80	85	86
Management expenses	661	710	748	845	921	1,012
Taxation	23	25	28	31	33	36
Total. Expenditure	30,540	34,023	51,134	57,605	66,106	(c) 69,078

(a) Figures are revised to 30 June 1981. (b) Includes estimate for claims outstanding. (c) Includes an allowance for claims not notified.

The Trust administers a Motor Vehicle Insurance Fund in which approved insurers participate. Premiums received from motor vehicle third party insurance and revenue from other sources constitute annual 'pools' and, after payment of claims and other expenses appropriate to each pool, the resulting profit or loss is shared by the participating insurers, which include the State Government Insurance Office. These shares cannot be finally determined until the last claim is paid and it is usually several years before a pool has satisfied all the claims

attributable to it. For this reason, the figures given in the previous table are subject to progressive revision as the business of each pool approaches finality.

Health Insurance Organisations

Health insurance is offered by a number of organisations which provide one or more types of benefit covering such items as hospital and medical fees, funeral expenses and sick pay to or on behalf of contributing members and their dependants. They include societies registered under the *Friendly Societies Act 1894-1975* and other organisations registered under the *National Health Act 1953* (Commonwealth).

Benefits are available in a wide range to meet the cost, either wholly or in part, of such services as treatment by a general or specialist medical practitioner (including surgical operations and obstetrical attention), X-ray, cardiographic and pathological examinations, physiotherapy, dental treatment, hospital care, home nursing and ambulance transport. Members of friendly societies may contribute also for the supply of medicines and some societies maintain endowment assurance funds and supplementary death benefit funds.

The following tables give details, for the years 1975-76 to 1980-81, of the membership and the financial activities of friendly societies registered under the Friendly Societies Act. 'Benefit' members are those who contribute to the Sick and Funeral Fund of a society and 'other' members are principally those who pay only for medical and hospital benefits.

FRIENDLY SOCIETIES — NUMBER, MEMBERS AND SICKNESS BENEFITS

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Registered societies	11	11	11	11	10	10
Branches	231	222	219	215	215	207
Members at end of year —						
Benefit members of sick and funeral funds	12,534	11,939	11,403	10,955	10,845	10,299
Total members (all benefits)	80,084	74,377	65,067	70,748	70,100	63,536
Sickness benefits (a) —						
Number of members paid	1,377	1,226	1,093	707	76	70
Number of weeks of sick pay	30,630	38,624	35,873	21,497	3,177	3,217

(a) From 1979-80 only two societies continued to pay sickness benefits.

FRIENDLY SOCIETIES — REVENUE AND EXPENDITURE (\$'000)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Revenue —						
Fees, contributions and levies	6,177	12,714	14,671	14,066	16,982	16,560
Interest, dividends and rent	249	265	294	320	381	437
Other	525	788	875	864	1,480	1,203
Total, Revenue	6,951	13,767	15,840	15,250	18,843	18,200
Expenditure —						
Sick pay	37	35	31	25	2	2
Medical attendance and medicine	6,011	10,813	13,915	13,490	16,078	16,789
Death benefits	58	60	61	74	103	106
Administration	509	649	753	834	960	1,000
Other	309	578	766	715	766	869
Total, Expenditure	6,924	12,135	15,526	15,138	17,909	18,766
Balance of funds at end of year	5,478	7,110	7,424	7,536	8,470	7,904

BUILDING SOCIETIES

Building societies in Western Australia are registered under the provisions of the *Building Societies Act 1976-1978* primarily for the purpose of raising funds to assist members by granting loans, secured on mortgage, to build or acquire homes. They also provide a means of investment for shareholder members, trustee funds and other depositors. The funds of the societies may be in the form of payment for fully-paid shares, subscriptions for contributing shares, money placed on deposit, or negotiated loans. Another important source of revenue

became available to the societies in 1956-57 when, under the *Housing Agreement Act* 1956 (Commonwealth), it was provided that moneys should be allocated to approved institutions from Commonwealth Government funds advanced to the States for housing. The current legislation, the *Housing Assistance Act* 1978 makes provision for financial assistance to the States for the three years ended 30 June 1981. The Act also provides that the amount of home purchase assistance to be made to the States in respect of the financial year ending 30 June 1981, shall be at least 40 per cent of the total amount of the advances in that financial year. Moneys received by the States under this Act may be made available to home purchasers through Building Societies as well as other lending agencies.

The following table shows particulars of the activities of permanent and terminating building societies registered in Western Australia for the years 1975-76 to 1980-81.

BUILDING SOCIETIES (a)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
PERMANENT SOCIETIES						
Number of societies	10	10	10	10	10	9
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Liabilities —						
Withdrawable shares	522.517	646.176	747.307	858.380	966.319	1,020.465
Deposits	286.320	383.451	508.710	681.851	812.817	994.100
Loans	25.695	29.525	28.700	31.804	33.365	34.864
Other	14.650	19.568	24.218	29.492	36.989	50.775
Total. Liabilities	849.182	1,078.720	1,308.935	1,601.527	1,849.490	2,100.204
Assets —						
Amount owing on loans	632.929	851.896	1,046.718	1,270.625	1,491.983	1,650.304
Deposits	162.577	105.022	170.788	209.507	170.132	214.263
Bills, bonds and other securities	42.857	43.624	71.962	99.246	162.811	202.718
Other	10.819	78.178	19.467	22.149	24.564	32.919
Total. Assets	849.182	1,078.720	1,308.935	1,601.527	1,849.490	2,100.204
Expenditure —						
Interest paid and payable	69.617	84.981	108.340	129.819	153.629	182.917
Other	11.879	16.317	19.671	23.609	26.606	30.757
Total. Expenditure	81.496	101.298	128.011	153.428	180.235	213.674
Income —						
Interest received and receivable	81.490	102.802	129.754	155.397	183.081	218.856
Other	2.849	3.729	4.409	5.626	7.074	7.336
Total. Income	84.339	106.531	134.163	161.023	190.155	226.192
TERMINATING SOCIETIES						
Number of societies	521	593	550	534	500	484
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Liabilities —						
Loans —						
Banks	n.a.	23.715	26.510	28.527	30.284	30.739
Government (b)	46.322	56.292	68.749	79.941	88.784	94.070
Other	n.a.	12.073	16.332	17.427	18.852	19.442
Other	n.a.	2.949	2.510	2.585	2.854	3.039
Total. Liabilities	80.504	95.029	114.101	128.480	140.773	147.290
Assets —						
Amount owing on loans (c)	71.568	84.534	102.537	115.597	126.696	129.721
Other	8.935	10.495	11.564	12.883	14.078	17.569
Total. Assets	80.504	95.029	114.101	128.480	140.773	147.290
Expenditure	n.a.	6.217	7.418	8.462	9.438	10.717
Income	n.a.	6.540	7.743	8.829	9.790	11.067

(a) The financial years shown do not relate to a uniform accounting period, the actual period varying according to the financial year adopted by individual societies. (b) Loans received by societies through the Commonwealth and State Housing Agreement. (c) Net of borrowing members' subscriptions for actuarial societies. Actuarial societies are those in which repayments of an advance are not normally offset against the advance until the sum of total subscriptions plus interest on these subscriptions equals the advance.

The *Building Societies Act* 1976-1978 established a Building Societies Advisory Committee of six members, comprising the Registrar of Building Societies as chairman and five other members appointed by the Minister. Of the five members, one shall be the Commissioner for Consumer Affairs or an officer of the Bureau of Consumer Affairs nominated by the Commissioner, three shall be persons each having experience in the conduct and management of a society or societies, and one shall be a person having extensive financial knowledge or experience but who is unconnected with the business of making loans for housing purposes.

The functions of the Committee, as set out in the Act, are to submit recommendations to the Minister for the more effective operation of societies; to make recommendations and submit proposals to the Minister from time to time with respect to regulations and model rules to be made under the Act; to investigate and report to the Minister on such other matters relating to societies and the provision of funds for home finance as may be referred to it by the Minister; to advise the Registrar on any matters referred to it by him; and to perform such other functions as may be prescribed.

INSTALMENT CREDIT FOR RETAIL SALES

The statistics in the following tables cover all types of instalment credit schemes which relate primarily to the financing of retail sales of goods in which repayment is made by regular predetermined instalments. Types of schemes covered include hire purchase, time payment, budget account and personal loans which relate primarily to the financing of retail sales of goods. In these statistics the term 'retail sales' relates to retail sales by retail establishments coming within the scope of the Censuses of Retail Establishments conducted periodically by the Australian Statistician, Canberra (see Chapter IX, Part 2).

Credit schemes which do not involve repayment by regular predetermined instalments, lay-bys, and all credit transactions which relate mainly to the financing of 'producer' type goods such as plant, machinery and motor vehicles which would normally be used for *commercial* purposes are outside the scope of these statistics. In addition, the instalment credit transactions of businesses covered by these statistics which relate primarily to the financing of sales of land, buildings, property improvements, travel and services such as repair and maintenance work, and schemes involving rental or leasing are not included.

In the following tables, statistics of type of business have been classified according to 'Finance companies' and 'Other businesses'. A definition of the former term is given in the section *Finance Companies*. Most of the businesses included in the category 'Other businesses' are those operating retail establishments which come within the scope of the Census of Retail Establishments and which provide instalment credit for retail sales of consumer commodities. The remaining businesses comprise unincorporated finance businesses, and businesses other than wholesalers and manufacturers, whose financing activities would generally be regarded as ancillary to some other function.

Details of balances outstanding at 30 June for the years 1976 to 1981, according to type of business, are given in the next table.

INSTALMENT CREDIT FOR RETAIL SALES BALANCES OUTSTANDING (a) (\$ million)

At 30 June —	Type of business		Total
	Finance companies	Other businesses	
1976	199.1	14.5	213.6
1977	255.1	15.3	270.3
1978	301.0	14.5	315.5
1979	316.8	11.9	328.8
1980	308.3	6.9	315.2
1981	324.9	7.6	332.5

(a) Includes hiring charges, interest and insurance.

In interpreting movements in outstanding balances, it should be noted that these movements are determined not only by new amounts financed and cash collections under existing agreements, but also by other liquidations of balances such as rebates allowed for early payouts and bad debts written off.

The amount financed in respect of instalment credit for retail sales of household and personal goods, and vehicles, according to type of credit and type of business during the years 1975-76 to 1980-81 is shown in the next two tables.

INSTALMENT CREDIT FOR RETAIL SALES — AMOUNT FINANCED
HOUSEHOLD AND PERSONAL GOODS
(\$ million)

Year	Finance companies			Other businesses			All businesses		
	Hire purchase	Other instalment credit	Total	Hire purchase	Other instalment credit	Total	Hire purchase	Other instalment credit	Total
1975-76	5.5	8.7	14.3	6.6	14.3	21.0	12.1	23.1	35.2
1976-77	6.4	16.1	22.4	5.5	16.5	22.1	11.9	32.6	44.5
1977-78	5.9	17.6	23.5	5.6	15.8	21.4	11.5	33.3	44.9
1978-79	8.0	17.6	25.6	5.1	14.3	19.4	13.1	31.9	45.0
1979-80	9.2	24.6	33.9	5.1	8.1	13.2	14.3	32.8	47.1
1980-81	13.9	26.7	40.6	5.6	8.2	13.8	19.5	34.8	54.4

INSTALMENT CREDIT FOR RETAIL SALES — AMOUNT FINANCED
MOTOR VEHICLES, ETC.: ALL BUSINESSES
(\$ million)

Year	Hire purchase				Other instalment credit				Total hire purchase and other instalment credit
	Cars and station wagons			Total	Cars and station wagons			Total	
	New	Used	Other (a)		New	Used	Other (a)		
1975-76	32.4	51.5	14.5	98.4	3.9	3.6	0.9	8.5	106.9
1976-77	36.9	65.0	18.8	120.7	4.5	4.6	0.6	9.7	130.4
1977-78	37.7	73.3	19.4	130.4	4.6	5.6	1.0	11.2	141.6
1978-79	35.3	75.4	16.9	127.5	3.7	6.0	1.4	11.1	138.7
1979-80	r 31.1	r 59.7	12.4	r 103.3	1.7	5.6	1.2	8.5	r 111.6
1980-81	39.0	59.3	16.2	114.5	2.1	7.6	2.5	12.2	126.6

(a) Includes new and used motor cycles, boats, caravans, trailers, motor parts and accessories.

FINANCE COMPANIES

Information relating to the lending operations of finance companies in Western Australia is given in the following tables. A comprehensive account of the scope of the statistics, definitions, and more complete details of the transactions of finance companies are given in the annual bulletin *Finance Companies Assets, Liabilities, Income and Expenditure* and the monthly statement *Finance Companies*, published by the Australian Statistician, Canberra.

For the purpose of these statistics, finance companies are defined as companies which are engaged mainly in providing to the general public (businesses as well as persons in their private capacity) credit facilities of the following types: hire purchase and other instalment credit for retail sales; wholesale finance; other consumer and commercial loans; factoring; leasing of business equipment and plant; and bill of exchange transactions. The finance companies covered in these statistics, in so far as they provide credit for retail sales, are also included in the statistics shown in the preceding section *Instalment Credit for Retail Sales*.

Amount Financed. The following table shows the amount financed, according to type of agreement, i.e. instalment credit for retail sales, wholesale finance, personal loans, other consumer and commercial loans, in Western Australia for the years 1975-76 to 1980-81.

FINANCE COMPANIES
AMOUNT FINANCED: TYPE OF AGREEMENT
(\$ million)

Year	Instalment credit for retail sales	Wholesale finance	Personal loans	Other consumer and commercial loans	Total
1975-76	120.1	307.8	15.4	239.9	683.2
1976-77	151.5	443.7	22.5	315.4	933.1
1977-78	164.8	443.6	31.2	411.6	1,051.3
1978-79	164.3	473.5	37.8	370.8	1,046.3
1979-80	r 145.6	476.5	r 44.8	r 416.3	r 1,083.2
1980-81	167.2	517.6	61.5	585.1	1,331.3

Collections and other Liquidations of Balances. The following table shows the collections and other liquidations of balances, according to type of agreement, i.e. instalment credit for retail sales, wholesale finance, and other consumer and commercial loans, made by finance companies in Western Australia for the years 1975-76 to 1980-81.

FINANCE COMPANIES
COLLECTIONS AND OTHER LIQUIDATIONS OF BALANCES
(\$ million)

Year	Instalment credit for retail sales	Wholesale finance	Personal loans	Other consumer and commercial loans		Total all contracts
				Contracts including charges	Contracts excluding charges	
1975-76	142.3	285.4	13.5	119.2	116.0	676.3
1976-77	174.2	397.8	19.0	121.8	159.2	872.0
1977-78	208.8	435.8	29.0	179.5	220.9	1,074.0
1978-79	236.4	475.9	46.3	207.1	205.4	1,171.2
1979-80	239.8	485.6	56.2	r 210.2	r 232.9	r 1,224.7
1980-81	240.1	552.2	57.2	243.1	272.6	1,365.3

Balances Outstanding. The following table shows the balances outstanding in Western Australia, according to type of agreement, and the total balances outstanding at the end of each year from 1975-76 to 1980-81.

FINANCE COMPANIES
BALANCES OUTSTANDING: TYPE OF AGREEMENT
(\$ million)

Year	Instalment credit for retail sales	Wholesale finance	Personal loans	Other consumer and commercial loans		Total all contracts
				Contracts including charges	Contracts excluding charges	
1975-76	199.1	71.0	22.5	166.1	113.5	572.2
1976-77	255.1	130.3	35.9	254.3	159.0	834.5
1977-78	301.0	149.8	51.8	314.7	164.9	982.2
1978-79	316.8	161.3	60.7	343.3	204.5	1,086.7
1979-80	308.3	161.1	r 70.1	r 378.0	r 269.6	r 1,187.1
1980-81	324.9	132.9	96.4	504.6	392.5	1,451.2

Business Plant and Equipment on Lease. The following table shows the initial capital cost of business plant and equipment on lease and the balances outstanding in Western Australia at the end of each year from 1975-76 to 1980-81.

**FINANCE COMPANIES
BUSINESS PLANT AND EQUIPMENT ON LEASE
(\$ million)**

Year	Initial capital cost of goods newly leased during year	Balances outstanding at end of year
1975-76	71.0	140.1
1976-77	117.3	223.1
1977-78	169.2	348.4
1978-79	226.6	482.1
1979-80	r 279.2	r 628.1
1980-81	351.6	791.0

BANKRUPTCY

Under the provisions of the *Bankruptcy Act* 1966 (Commonwealth), which is administered by the Attorney-General, the State of Western Australia is a proclaimed Bankruptcy District and the Supreme Court of Western Australia has federal jurisdiction in bankruptcy matters. There is a Registrar in Bankruptcy whose duties include the holding of public sittings for the examination of bankrupts, the examination of witnesses, the issuing of bankruptcy notices and creditors' petitions, and such other duties as are specified in the Act or delegated to him by the Court. Another bankruptcy officer is the Official Receiver, who acts under the general authority and direction of the Court and whose duties relate to the conduct of the debtor and to the realisation and administration of his estate.

The bankruptcy of an estate may result from a petition by either the debtor or the creditors. In cases where it appears certain that the assets of a deceased estate will be insufficient to meet the debts, the executor or a creditor may petition to have the estate administered in bankruptcy.

Compositions, deeds of assignment and deeds of arrangement are provided for in the Act. A debtor may call a meeting of his creditors and either compound with them to pay a certain sum in the \$ as full settlement of his debts or enter into a deed of arrangement allowing him a specified time in which to pay. On the other hand, his creditors may require him to execute a deed of assignment, by which control of his affairs passes to a trustee registered under the Act, or to file a petition in bankruptcy.

The following table relates to bankruptcy proceedings during each of the years from 1975-76 to 1980-81.

BANKRUPTCY PROCEEDINGS

Bankruptcies (a)					Compositions, arrangements and assignments without sequestration		
On petition of —							
Year	Creditors	Debtors	Assets (\$'000)	Liabilities (\$'000)	Number	Assets (\$'000)	Liabilities (\$'000)
1975-76	20	181	667	2,676	57	1,355	3,209
1976-77	4	176	556	2,491	35	1,447	1,679
1977-78	13	248	1,331	3,634	47	1,904	2,185
1978-79	19	389	1,166	5,908	91	2,344	4,571
1979-80	26	555	2,670	10,228	121	4,685	8,311
1980-81	42	584	2,473	11,582	101	2,269	7,472

^a Includes orders for administration of deceased persons' estates.

PUBLIC TRUST OFFICE

The *Public Trustee Act 1941-1979* established the Public Trust Office which is administered by the Public Trustee.

PUBLIC TRUST OFFICE

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Matters accepted for administration —						
Estates of —						
Deceased persons	1,647	1,536	1,402	1,455	1,413	1,386
Mentally incapable persons	111	112	89	93	117	111
Infirm persons	57	44	49	54	85	93
Uncared-for property	1	1	—	—	—	2
Court trusts	137	183	128	139	145	142
Workers' compensation	98	72	87	86	101	68
Agencies	19	25	30	35	47	75
Total	2,070	1,973	1,785	1,862	1,908	1,877
Matters on hand at 30 June	6,623	6,658	6,431	6,242	6,204	6,078
Value of transactions —	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Trust moneys received	18,010	23,856	29,558	27,800	31,043	34,459
Trust moneys paid	14,924	18,268	22,592	24,264	27,250	32,355
Unclaimed moneys paid to Consolidated Revenue Fund	70	82	148	91	98	162
Value of estates and other matters on hand at 30 June	51,776	67,109	72,247	79,440	88,796	97,389

The principal functions of the Public Trustee are the administration of the estates of deceased persons, including intestate estates; the management of the affairs of certain persons rendered incapable by mental illness or other infirmity; and the receipt of moneys under the control or order of the Supreme Court of Western Australia, to be invested and used for the maintenance, education or other benefit of the persons entitled thereto. The Public Trustee receives from the Workers' Compensation Board funds to be held in trust for investment and to be paid out at the direction of the Board. He may also act in the capacity of agent in cases of need.

OFFICE OF TITLES

The Office of Titles was established under the provisions of the *Transfer of Land Act 1893-1978*. The Act provides for the appointment of a Commissioner of Titles, a Deputy Commissioner of Titles and a Registrar of Titles. The principal functions of the Office are the registration and recording of all instruments and dealings affecting privately-owned land or land alienated from the Crown, the certification and issue of titles to lands, and the maintenance of a register of legal ownership.

The number of documents accepted for registration during the year ended 30 June 1981 was 220,046.

OFFICE OF TITLES

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of registrations —						
Certificates of title —						
Crown grant	1,744	1,989	1,738	2,056	1,547	1,146
Other	26,060	32,070	32,411	27,361	28,905	26,810
Leases —						
Crown	310	346	323	463	436	382
Other	46	29	32	40	33	41
Transfers	63,618	58,978	55,679	53,400	57,495	63,417
Mortgages	52,070	50,557	52,797	55,485	59,095	62,566
Discharges of mortgages	43,822	42,440	41,409	44,548	47,960	53,778
Caveats lodged	8,766	10,806	11,508	12,066	12,848	11,735
Amount of consideration —	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Transfers	1,097,115	1,200,378	1,526,188	1,737,786	1,959,002	2,726,514
Mortgages	1,078,364	1,083,270	1,385,635	1,797,147	2,313,716	2,925,700
Fees collected	3,180	3,448	3,492	3,606	3,925	5,123
Expenditure	2,182	2,489	2,815	2,858	3,317	3,856
Assurance Fund —						
Amount of credit at 30 June	318	331	356	397	423	458

CORPORATE AFFAIRS OFFICE

The Commissioner for Corporate Affairs is responsible, subject to the Minister, for the administration of the *Companies Act 1961-1980*, the *Business Names Act 1962-1976*, the *Associations Incorporation Act 1895-1969* and the *Bills of Sale Act 1899-1981*.

CORPORATE AFFAIRS OFFICE

Particulars	1976	1977	1978	1979	1980	1981
Number of registrations effected —						
Local companies (a)	3,440	4,450	2,743	3,191	5,224	7,401
Other companies	304	392	430	485	506	719
Business names	24,378	25,765	29,000	30,760	33,383	35,355
Associations	238	220	254	246	308	258
Bills of sale and liens —						
Registrations	79,320	83,188	84,001	84,803	86,357	88,899
Satisfactions entered	800	594	701	689	769	812
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Amount of bills of sale and liens —						
Registrations	465,303	423,287	480,479	517,453	502,099	741,371
Satisfactions entered	9,361	10,696	17,025	11,758	35,144	39,857
Fees collected (b)	1,914	2,417	2,693	3,261	3,610	4,458

(a) Companies incorporated in Western Australia.

(b) Year ended 30 June.

LOTTERIES AND BETTING

Lotteries

The Lotteries Commission was established under the provisions of the *Lotteries (Control) Act 1932*. The legislation currently in force is the *Lotteries (Control) Act 1954-1981*. The Commission, as constituted by the Act, consists of four members appointed by the Minister. The principal functions of the Commission are to conduct lotteries and other similar devices in Western Australia to raise money for charitable purposes, and to control lotteries conducted by other persons. More recently, the *Lotto Act 1981* was enacted to provide for the conduct of lotto games by the Commission either in its own right or in association with like authorities in other States.

LOTTERIES COMMISSION — NUMBER OF CONSULTATIONS AND TICKET SALES

	Type of lottery										
Year	\$25	\$20	\$10	\$7	\$5	\$4	\$3	\$2	\$1	50c	Total
NUMBER OF CONSULTATIONS											
1975-76	2	—	3	—	3	—	—	3	46	101	158
1976-77	1	1	2	1	2	—	1	12	52	97	169
1977-78	—	2	3	—	2	—	1	22	76	48	154
1978-79	—	1	2	—	4	2	—	26	94	—	129
1979-80	—	2	1	—	3	1	—	26	90	—	123
1980-81	—	1	2	—	2	—	—	28	93	—	126
NUMBER OF TICKETS SOLD ('000)											
1975-76	200	—	300	—	300	—	—	300	4,600	10,100	15,800
1976-77	100	100	200	100	200	—	100	1,200	5,200	9,700	16,900
1977-78	—	200	300	—	200	—	100	2,200	7,600	4,800	15,400
1978-79	—	100	200	—	400	200	—	2,600	9,400	—	12,900
1979-80	—	200	100	—	300	100	—	2,600	9,000	—	12,300
1980-81	—	100	200	—	200	—	—	2,800	9,300	—	12,600
RECEIPTS FROM TICKET SALES (\$'000)											
1975-76	5,000	—	3,000	—	1,500	—	—	600	4,600	5,050	19,750
1976-77	2,500	2,000	2,000	700	1,000	—	300	2,400	5,200	4,850	20,950
1977-78	—	4,000	3,000	—	1,000	—	300	4,400	7,600	2,400	22,700
1978-79	—	2,000	2,000	—	2,000	800	—	5,200	9,400	—	21,400
1979-80	—	3,998	1,000	—	1,500	400	—	5,200	9,000	—	21,098
1980-81	—	2,000	2,000	—	1,000	—	—	5,600	9,300	—	19,900

LOTTO GAMES — NUMBER OF GAMES AND COUPON SALES

Particulars		1978-79	1979-80	1980-81
Number of games		18	50	50
Number of coupons sold	'000	1,044	3,519	5,637
Receipts from coupon sales	\$'000	2,344	7,814	13,159

The Acts require that all prizes distributed in lotteries and lotto games conducted by the Commission shall be cash prizes. It is further provided that the total expenses of conducting lotteries and lotto games in any year, including commission payable on ticket sales and the remuneration of members of the Commission, shall not exceed 25 per cent of the gross amount received from the sale of tickets.

The Commission is required to pay 20 per cent of all moneys received in respect of lotteries and lotto games into a special account, which is kept at the Treasury in terms of the *Hospital Fund Act 1930-1937*. Moneys remaining to the credit of the Commission after meeting all outgoings authorised by the Act may, with the consent of the Minister, be applied to any approved charitable purpose or in the purchase, improvement or maintenance of lands and buildings for the purposes of the Act.

LOTTERIES COMMISSION — FINANCIAL TRANSACTIONS (\$'000)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
GENERAL ACCOUNT						
Receipts —						
Sale of lottery tickets	19,750	20,950	22,700	21,400	21,098	19,900
Lotto subscriptions	—	—	—	2,344	7,814	13,159
Total	19,750	20,950	22,700	23,744	28,912	33,059
Expenses —						
Prize money	12,197	12,900	14,026	14,529	17,367	19,873
Commission on ticket sales	1,448	1,542	1,696	1,796	2,202	2,541
Salaries and superannuation	278	324	349			
Advertising	356	371	436	1,583	1,675	1,971
Other	219	249	245			
Total	14,497	15,387	16,752	17,908	21,245	24,385
Surplus available for distribution	5,253	5,563	5,948	5,836	7,668	8,674
ACCUMULATED FUNDS ACCOUNT						
Balance at beginning of year	485	744	1,138	1,115	1,976	2,993
Surplus available for distribution	5,253	5,563	5,948	5,836	7,668	8,674
Unclaimed prizes	275	290	330	356	r 406	549
Rent and interest received	297	540	570	566	685	878
Other	32	12	50	1,567	r 12	1
Total	6,343	7,149	8,035	9,440	r 10,746	13,095
Grants approved	5,580	5,962	6,375	6,564	r 7,718	10,619
Lotto fund	—	—	500	—	—	—
Prizes paid	14	42	44	27	r —	—
Other	5	7	1	873	35	—
Total	5,599	6,011	6,920	7,464	r 7,753	10,619
Balance at end of year	744	1,138	1,115	1,976	2,993	2,476
AMOUNT OF GRANTS PAID						
Hospitals and medical and health services	3,746	5,058	5,044	5,428	5,842	7,836
Homes, orphanages and mission centres	553	325	621	548	468	555
Infant health services	18	30	24	15	9	26
Other charitable organisations	517	524	663	873	878	1,879
Total	4,835	5,937	6,352	6,865	7,197	10,296

Betting

The *Betting Control Act 1954-1978* and the *Totalisator Agency Board Betting Act 1960-1973* provide for the regulation and control of betting and bookmaking on horse racing and greyhound racing in Western Australia.

The Betting Control Act authorises the Totalisator Agency Board to issue licences enabling the holder to carry on the business of bookmaking on a race-course or at registered premises, and betting by or with a person not so licensed is unlawful.

The Totalisator Agency Board Betting Act gives the Totalisator Agency Board authority to regulate and control off-course betting on totalisators through the Board and betting with the Board. The Board consists of eight members, one of whom is the General Manager of the Board. The other seven members are appointed by the Governor and comprise a chairman nominated by the Minister, three persons nominated by The Western Australian Turf Club, and three persons nominated by the Western Australian Trotting Association.

The application of the Act is confined to areas declared by proclamation to be 'totalisator agency regions'. The first agency established by the Board was opened on 18 March 1961. At 31 July 1981 there were 164 agencies in operation.

The Board derives its principal revenues from commission on bets and from a duty of 1½ per cent on the gross takings of every totalisator, as provided by the *Totalisator Duty Act 1905-1973*. The Board may also borrow money, subject to the approval of the Treasurer. The Totalisator Agency Board Betting Act requires that the Board shall pay to The Western Australian Turf Club, the Western Australian Trotting Association and the Greyhound Racing Control Board the funds remaining after meeting all taxes and other specified items of expenditure.

Details of taxes, licence fees and duties payable in connection with horse racing are shown in Part 1 of this Chapter and the amounts collected during the six-year period ended 30 June 1980 appear in the table *State and Local Authorities: Taxation by Type of Tax* also in Part 1.

The following table shows the amounts invested on totalisators on race-courses and through agencies of the Totalisator Agency Board, and amounts invested with licensed bookmakers, during each of the six years 1975-76 to 1980-81.

TOTALISATOR INVESTMENTS AND INVESTMENTS WITH LICENSED BOOKMAKERS

Type of investment	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Totalisator investments —						
On course	28,460	30,893	32,026	36,239	37,479	39,801
Off course (a)	145,191	157,414	177,709	190,245	201,919	232,585
Total	173,651	188,308	209,735	226,484	239,398	272,386
Investments with licensed bookmakers —						
On course	71,160	73,231	91,105	105,711	101,588	108,579
Off course	23	21	17	—	—	—
Total	71,184	73,251	91,123	105,711	101,588	108,579
All investments —						
On course	99,621	104,124	123,131	141,950	139,066	148,380
Off course	145,215	157,435	177,726	190,245	201,919	232,585
Total	244,835	261,559	300,858	332,195	340,985	380,965
Per head of mean population	\$ 211	\$ 221	\$ 249	\$ 270	\$ 272	\$ 298

(a) Investments made through agencies of the Totalisator Agency Board.

THE STOCK EXCHANGE OF PERTH LIMITED

The following table gives details of turnover during each of the five years 1975-76 to 1980-81.

THE STOCK EXCHANGE OF PERTH LIMITED TURNOVER OF STOCKS AND SHARES (Figures supplied by The Stock Exchange of Perth Limited)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
NUMBER OF SHARES TRADED						
	'000	'000	'000	'000	'000	'000
Ordinary —						
Industrial	21.005	24.122	30.449	36.892	57.424	84.919
Oil	9.542	9.050	12.304	26.166	120.640	251.293
Mining	31.246	42.018	57.750	115.498	300.702	494.238
Preference —						
Industrial	49	51	90	83	80	} 31
Mining	17	15	9	3	4	
Total	61.858	75.257	100.602	178.644	478.850	830.480
VALUE OF TURNOVER						
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Shares —						
Ordinary —						
Industrial	18.690	24.731	46.864	46.468	110.161	128.975
Oil	4.335	3.392	4.640	7.033	50.912	142.500
Mining	11.652	11.912	18.109	46.022	185.938	271.747
Preference —						
Industrial	74	63	91	114	86	} 203
Mining	12	10	5	4	17	
Total	34.761	40.108	69.709	99.641	347.114	543.424
Commonwealth and semi-government loans	950	3.301	1.464	8.651	1.013	216
Debentures, unsecured notes, etc.	2.893	3.840	4.914	10.764	2.435	861
Total	3.843	7.141	6.378	19.415	3.448	1.077
Total value of turnover	38.604	47.249	76.087	119.056	350.561	544.501

The Stock Exchange of Perth was registered as a limited company under the provisions of the Companies Act on 30 June 1971. At that date there were thirty-five members of the Exchange, and at 30 June 1981 there were thirty-one members.

The Stock Exchange of Perth commenced operations in 1889, and conducted business at a number of locations before moving in December 1968 to its present quarters at Exchange House. These premises were designed and constructed to provide adequate space for total post trading which was introduced in July 1967, replacing the call system in which brokers made bids from their desks as stocks were called by a member of the Exchange staff.

CHAPTER VII

LAND, WATER SUPPLY AND CONSTRUCTION

Part 1 — Land Tenure and Settlement

An outline of the origin and development of the land tenure system in Western Australia from the early years of settlement is given in Chapter VII of the *Official Year Book of Western Australia*, Nos. 1 and 2 (New Series).

The growth of land settlement in relation to particular agricultural and pastoral activities is dealt with in the relevant sections of Chapter VIII and in the *Statistical Summary* appearing after Chapter X.

LEGISLATION AND ADMINISTRATION

By the Land Act of 1898, earlier legislation relating to the sale, occupation and management of Crown lands was consolidated and amended. Under a series of Agricultural Lands Purchase Acts which were passed between 1896 and 1904 and consolidated by the *Agricultural Lands Purchase Act 1909*, provision was made for the repurchase by the Crown of land suitable for closer settlement. The principal criteria applied in the purchase of such land were suitability for wheat or mixed farming and proximity to transport, especially the railways.

The operation of subsequent legislation has not greatly changed the pattern of land development which was created by the *Land Act 1898* and the *Agricultural Lands Purchase Act 1909*. The *Land Act 1933-1980* is now the basic statute controlling the leasing and disposal of Crown land. Crown land is also leased under the Mining Act, the Petroleum Act and the Forests Act but no alienations are made under these Acts. In most freehold or leasehold titles of a residential, agricultural or pastoral nature the mineral rights and petroleum rights are reserved to the Crown.

The Department of Lands and Surveys is responsible for the leasing and alienation of Crown land, except where mining and forestry tenures are involved, and is under the control of the Minister for Lands. In certain instances, advisory or partly-executive boards have been created to assist in administration. These include the Land Board, which deals with general applications for land, and the Pastoral Board.

Permits and leases for mining purposes are issued by the Department of Mines and those for forestry and timber milling by the Forests Department.

METHODS OF LAND ALIENATION

The principal methods of alienation provided for in the *Land Act 1933-1980* are conditional purchase, the sale of town and suburban land by either auction or inviting applications, selection under Part VIII which superseded the Agricultural Lands Purchase Act and reservation for public purposes, including Crown grants in trust for the purpose of the reserve. In addition to these normal methods of alienation there is provision in the Land Act for the release of land under special circumstances where particular development projects are envisaged. In such cases any agreement must be ratified by the State Parliament.

Conditional Purchase

Titles secured by this method originally take the form of conditional purchase leases, on the satisfactory conclusion of which Crown grants may be obtained. The Act provides that a person may not acquire, either as lessee or transferee, an area of land exceeding in the aggregate

2,023 hectares; but on the recommendation of the Minister and with the approval of the Governor, a person may acquire an area of land in one or more parcels exceeding 2,023 hectares, but not in any event exceeding 4,046 hectares, in any case where the Minister is satisfied that a holding requires an area greater than 2,023 hectares in order to be of a standard deemed by the Minister an economic farm unit. The Governor may reduce the maximum area that may be acquired in prescribed localities. The minimum purchase price of land acquired by conditional purchase is forty-nine cents per hectare and the purchaser must pay the costs of survey as well as the value of any improvement. He must progressively clear, cultivate and sow to pasture or crop, areas of land which must aggregate 50 per cent of the total area of the land at the end of the eleventh year.

The maximum period allowed for completion of purchase under an ordinary conditional purchase lease ranges from twenty-five to thirty years, with a possible extension of ten years in certain cases. There is, however, provision for conditional purchase by means of accelerated payments under which a 10 per cent deposit is lodged and the balance of the purchase price paid in four quarterly instalments. The improvement conditions for accelerated-payment leases require the land to be fenced within three years of the commencement of the lease and improvements, equal in value to the purchase money, to be effected within seven years. Unlike the ordinary conditional purchase lease, which cannot be converted to a Crown grant until the expiry of at least five years from the date of commencement, an accelerated-payments type of lease can be converted to a Crown grant at any time after the conditions have been met. Residential conditions, requiring the lessee or a near relative to reside on the property within two years from commencement of the lease and make it his habitual residence during at least six months of each year for the following three years, apply to ordinary conditional purchase leases but are not obligatory under accelerated-payment leases. Restrictions on transfers are imposed in each case.

Sale of Town and Suburban Land

The general conditions governing the sale to the public by auction of town and suburban land are set out in Part IV of the Land Act. Lands may be offered for sale at auction by order of the Minister at such times and places as he may think fit and notice of forthcoming sales must be published in the *Government Gazette of Western Australia* and in a newspaper. Ten per cent of the purchase money must be paid at the time of sale and the balance is payable over a period as stipulated at the time of sale, in any event not exceeding two years. The purchaser is normally required to erect a residence or business premises within a specified period, usually two or four years, from the date of sale. Town or suburban land acquired is held under a licence until such time as the development requirement as specified in the conditions of sale has been fulfilled, after which a grant in fee simple may be issued. In some instances special additional conditions may be imposed. In certain circumstances the Governor may dispense with the requirements as to the sale of town and suburban lands by public auction and may approve of any such land being offered for sale in fee simple or for leasing.

Reservation for Public Purposes

The Governor may dispose of, in any manner which serves the public interest, lands which are vested in the Crown. Crown land is frequently reserved by order of the Governor for a variety of public purposes. Where alienation is ultimately required for certain of such purposes the necessary land is granted in fee simple in trust for the purpose of the reserve. Grounds for reservation include: the general requirements of the Government (e.g. public works and buildings; national parks; conservation of water, timber and indigenous flora and fauna; housing; public health and social welfare); the use and benefit of the Aboriginal inhabitants; local government needs for such purposes as the provision of town halls and other buildings, public utilities, social amenities, sports grounds and cemeteries; sites for churches, hospitals and other institutions; sites for clubs and club premises; mining and quarrying purposes; public parks; and

the provision of camping and watering places for travellers and stock. Reserves may be of class 'A', which by proclamation of the Governor are reservations that must remain dedicated to the purpose declared in their proclamation until by Act of Parliament it is otherwise enacted, or classes 'B' and 'C', which are terminable by the Governor on notice in the *Government Gazette of Western Australia*. In the case of class 'B', however, the Land Act provides that in the event of cancellation, a special report by the Minister shall be presented to Parliament setting out the reasons for such cancellation and the purpose to which it is intended to devote the land. Common uses of class 'A' reserves are for public recreation, national parks, conservation of flora and fauna, for major public buildings, and for areas of particular historical importance. All reserves under Part III of the Act that are not proclaimed as class 'A' are classified as either 'B' or 'C'.

The Land Act provides that, when any reserve is not immediately required for the purpose for which it was made, the Governor may grant a lease for a period not exceeding ten years at such rents and subject to such conditions as he may think fit. Land reserved for parks or recreation grounds may be leased for the depasturing of stock even though the land is being used for the purpose for which it is reserved.

Other methods of alienation comprise mainly reservations of land for housing projects.

State Forests and Timber Reserves

Special provision is made in the Forests Act for the Governor, by Order in Council, to dedicate Crown land as a State Forest or to reserve Crown land as a Timber Reserve. While the reservation of a Timber Reserve may be revoked in whole or in part by the Governor in Council, following a report of the Conservator of Forests, the dedication of a State Forest may not be revoked except with the consent of both Houses of Parliament. The use of such Forests and Reserves comes within the administration of the Conservator of Forests.

METHODS OF LEASING

Brief reference was made earlier to the work of the Department of Lands and Surveys, the Department of Mines and the Forests Department in granting leases of Crown lands in Western Australia. The activities of each Department in this field are now described in greater detail.

Department of Lands and Surveys

Approximately 99 per cent of the Crown land held under lease is covered by tenures granted by the Department of Lands and Surveys under the Land Act, and consists mainly of pastoral leases, special leases, leases of reserves and leases of residential and industrial lots. In addition, areas of perpetually-leased farming land have been made available to ex-servicemen under War Service Land Settlement Acts.

Pastoral Leases. The *Land Act 1933-1980* provides that the maximum area held under pastoral lease by one person, or by two or more persons jointly, or by any association of persons incorporated shall not exceed 500,000 hectares, and that no person shall become beneficially interested in leases of pastoral land to an extent whereby the aggregate area of pastoral land in which such person is beneficially interested would exceed 500,000 hectares. Where an area of pastoral land is worked in association with another area as one separate and distinct station, the maximum area which may be so worked is 500,000 hectares. The minimum requirement for the grant of a pastoral lease is that the land shall, in the opinion of the Pastoral Board, be capable when fully developed of carrying not less than 6,000 sheep or not less than 1,200 head of cattle.

Pastoral leases are granted for a term expiring on 30 June 2015, and the annual rent payable is determined by the Minister for Lands acting on the advice of the Pastoral Board. Rents are subject to reassessment at statutory intervals. A lessee may, at any time not less than five years nor more than six years after the date on which a reassessment of rent became effective, apply to the Minister to have the rent reviewed by the Board. Provision is made for total or partial relief

from payment of rent in respect of any year during which, by drought, cyclone, fire or flood, a lessee suffers serious loss of stock, or wool production is adversely affected.

The holder of a pastoral lease is required to effect improvements of a specified nature and in accordance with a plan approved by the Minister on the advice of the Board. The amount spent on improvements each year must be at least two and a half times the annual rent, and expenditure at this rate must continue until the improvements proposed in the plan have been carried out. A lease is liable to forfeiture if the land is not stocked or kept stocked with such number of sheep or cattle, or both sheep and cattle, as the Board considers appropriate having regard to circumstances such as seasonal conditions affecting the land and the period since the commencement of the lease. Other conditions attaching to pastoral leases provide safeguards against the deterioration of land due to excessive grazing and to the unauthorised ring-barking of trees.

Special Leases. Section 116 of the Land Act specifies a variety of industrial and other purposes for which the Governor may grant special leases of Crown land. The yearly rental must be not less than \$4 and the period of the lease must not exceed twenty-one years. It is further provided that, in all cases where the intended period of leasing exceeds ten years, prior notice must be inserted in the *Government Gazette of Western Australia*. Section 116 is modified in certain cases by provisions contained in special Acts to enable the granting of leases for varying terms and conditions for specific projects.

Leases of Reserves. As stated earlier in this Chapter in the section *Methods of Land Alienation* the Governor may grant a lease of any reserved land which is not immediately required for the purpose intended at the time of reservation, but the period of the lease may not exceed ten years. By a further provision of the Land Act, no lease for a term exceeding one year shall be granted unless applications are called by notice in the *Government Gazette of Western Australia*. With the consent of the Governor, such land may be sub-leased. When land is reserved for parks or for recreation or amusement, if the land is not placed under the control or management of any person, the Governor may, even though the land is being used for the purpose for which it is reserved, grant a lease or licence for one year for the purpose of depasturing stock. The Governor may insert in the lease or licence such conditions as he may think fit to ensure that the land is available for the purpose for which it is reserved and he may renew any lease or licence for a further period of one year. The *Land Act 1933-1980* also provides that the Governor may direct that the reserve may be leased for the purpose for which it is reserved.

Leases of Residential Lots. The Governor may lease any town or suburban lands on such terms as he may think fit, under section 117 of the Land Act. In earlier years, leases of town and suburban lands were offered at public auction and, in most cases, such lessees may apply to purchase the fee simple of the land.

Perpetual Leases were authorised under the War Service Land Settlement legislation, which provided that ex-servicemen who had been allotted farms under this joint Commonwealth-State scheme and who met the requirements of the appropriate agreement might enjoy perpetual leases. The lessee, on payment of such purchase price for the fee simple as was fixed by the Minister, might obtain the freehold of the property after the expiration of ten years from the commencement of the term of the perpetual lease or after such shorter period as the Commonwealth and the State determined or might determine where special circumstances existed.

Department of Mines

Under the provisions of the Mining Act various special tenures, of which gold-mining leases, mineral leases and coal-mining leases are the most important, are granted by the Governor in connection with the mining of gold, coal and other minerals. The Act contains

provisions relating to the payment of fees, rents and royalties. The Governor may exempt any person or class of persons from the payment of royalties.

Oil exploration permits and production licences are granted by the Minister for Mines under the provisions of the Petroleum Act and as the Designated Authority under the provisions of the Petroleum (Submerged Lands) Act with authority to charge fees, rents and royalties.

Gold-mining Leases. As well as conveying a right to mine for gold to any depth, a gold-mining lease permits the construction of all necessary buildings and plant within the area which it defines. Where, in the opinion of the Minister, land is likely to contain alluvial gold, it is normally exempt from lease. However, a lease not exceeding 19.4 hectares in area may be granted if the Minister is satisfied that the land, having already been worked for alluvial gold has been abandoned, or is suitable for leasing on account of its great depth or excessive wetness, or on account of the costliness of the appliances required for its development. A lease not exceeding 9.7 hectares may also be granted if the Minister considers for any sufficient reason that such land ought not to be exempt from lease. In all other instances the maximum area for a lease is 9.7 hectares. Leases must, where practicable, be rectangular with the length not exceeding twice the width.

The term of any gold-mining lease may not exceed twenty-one years, but has a right of renewal for a further twenty-one years. Its labour conditions provide that for the first year it must be manned by at least two men and for the remainder of its term by at least two men, or one man for every 2.4 hectares, whichever is the greater. Subject to certain adjustments of these labour conditions, a person may hold two or more adjoining leases as an amalgamated group, provided that the group does not total more than 38.8 hectares and that the length along the line of reef or lode does not exceed 1,328 metres. The Minister has discretion, in certain circumstances, to permit the amalgamation of leases which would result in an aggregate area exceeding 38.8 hectares but the length of reef or lode still may not exceed 1,328 metres. A rent of fifty cents per 0.4047 hectares is charged during the first year and \$2 during the following years. The grant of a gold-mining lease conveys an exclusive right to mine for gold or other minerals within the bounds of the lease, but excludes rights in respect of petroleum.

Mineral Leases. Mineral leases authorise the holders to mine for a specified mineral or combination of minerals to any depth within the confines of the lease and convey the same construction rights as a gold-mining lease. The term of any mineral lease shall not exceed twenty-one years, but shall have a right of renewal for a further twenty-one years. Except under special conditions, including the payment of royalty, as set out in the Act, land held under a mineral lease may not be mined for gold. Land which is proved to the satisfaction of the Minister to consist of payable alluvial ground is normally exempted from lease. However, a lease not exceeding 38.8 hectares in area may be granted if the Minister is satisfied that the land, having already been worked as alluvial ground, has been abandoned, or is suitable for leasing on account of its great depth, excessive wetness, or on account of the costliness of the appliances required for its development. A lease not exceeding 121.4 hectares may also be granted if the Minister considers for any sufficient reason that such land ought not to be exempt from lease. In all other cases a mineral lease may not exceed 121.4 hectares and, where practicable, must be rectangular and the length shall not exceed twice the width. The labour conditions provide that a mineral lease must be manned by at least two men for the first twelve months and thereafter by at least one man for every 2.4 hectares or fraction thereof, with a minimum of two men. An annual rent of \$2 per 0.4047 hectares is charged. Adjoining leases may, by application to the Minister, be amalgamated but the total area may not exceed 242.8 hectares.

Coal-mining Leases. Individual leases for coal mining have a maximum area of 129.5 hectares. The term of any coal-mining lease may not exceed twenty-one years, but has a right of renewal for a further twenty-one years. Such leases must be efficiently worked during the

first twelve months by at least one man, during the next twelve months by at least two men, and during each succeeding year of the lease by at least three men for every 24.3 hectares or part thereof contained in the lease. The yearly rent of coal-mining leases is five cents per 0.4047 hectares and a royalty of 2.5 cents per 1.02 tonnes is payable on all coal raised during the first ten years of the lease, rising to five cents during the remainder of the term. The Mining Act provides for certain royalty rebates on newly-discovered coal deposits while the Mining Regulations contain special provisions regarding development of the deposits in the Collie district, the only area where coal is being mined in the State.

Other Mining Tenements. *Mineral Claims.* An area not exceeding 121.4 hectares may be applied for as a mineral claim, but the length must not exceed twice the width. The rent for a mineral claim is calculated at the rate of fifty cents per annum per 0.4047 hectares. Working conditions require that not less than three men shall be continuously employed for every 40.5 hectares or fraction thereof. *Dredging Claims.* Application may be made for dredging claims for gold or minerals in lakes, swamps, marshes, or rivers and the land adjacent thereto, or on the foreshore of, and land under, the ocean. The maximum area of a dredging claim shall not exceed 121.4 hectares. Except in the case of river claims, where there is no restriction on width, the minimum width at right angles to the bank or shore edge shall not be less than 302 metres. A river claim shall not exceed 9.7 kilometres in length. Working conditions require that not less than three men shall be continuously employed on the claim for every 40.5 hectares or part thereof. In the case of dredging claims that have been amalgamated, provision is made for the continuous employment of machinery and equipment in lieu of employing men.

Temporary Reserves. To encourage mining exploration, provision is made for the creation by the Minister of temporary reserves of Crown land and the Minister may also authorise any person to temporarily occupy such reserve on any terms that he thinks fit.

The acceptable maximum area which may be applied for in any one temporary reserve application is — for gold with or without other minerals — 121.4 hectares; for iron ore — 129.5 square kilometres; for other minerals — 200 square kilometres.

The shape of the area shall be as near as practicable to a rectangle with the length not exceeding twice the breadth.

The annual fee required with each application is — for gold with or without other minerals — \$100; for coal only — \$100 plus \$18 per square kilometre (or part thereof); for other minerals — \$100 plus \$8 per square kilometre (or part thereof).

Full details of the proposed exploration expenditure and programme, and methods to be used are required before any application for the creation of a temporary reserve can be considered by the Minister. The lowest acceptable annual expenditure commitment on each temporary reserve is — for gold with or without other minerals — \$3,000; for coal only — \$100 per square kilometre (minimum \$10,000 if the area is less than 100 square kilometres); for other minerals — \$200 per square kilometre (minimum \$20,000 if the area is less than 100 square kilometres).

The initial term of any right of occupancy granted is twelve months. Applications for renewal of such occupancy right are not considered unless lodged at least fourteen days prior to the expiry date of any current right of occupancy and accompanied by the requisite annual fee and full details of the proposed exploration programme and expenditure.

In the event of any mineral being found by the holder of an occupancy right granted over a temporary reserve, the holder is required, during the currency of the occupancy right, to peg and apply for mining tenements, before productive mining is commenced.

Tenures under Special Acts. Because of the amount of finance involved in large-scale development of iron ore, bauxite, nickel, salt and various other mineral deposits the Government has made special agreements with various companies for the working of such deposits. The

agreements are ratified by an Act of Parliament and mineral rights are granted to the lessee to carry out large-scale development and mining operations, subject to the varying obligations including the payment of royalties.

Tenures under provisions of the Petroleum Act 1967-1981. This Act came into operation on 5 September 1969 and governs the exploration for and exploitation of the petroleum resources within Western Australia. It is basically similar to the Petroleum (Submerged Lands) Act, the principal tenures available being Permits and Licences.

A permit grants to the holder petroleum exploration rights over an area of up to 200 contiguous blocks (a block is a graticular section being five minutes of arc of latitude by five minutes of arc of longitude) which is valid for a term of five years and renewable for terms of five years over progressively reduced areas. Initially, areas are made available for application as exploration permits by advertisement in the *Government Gazette of Western Australia*. If several applications are received for a particular area, each is evaluated on its individual merits and a decision as to the grant of a permit is made accordingly. Applicants are required to submit details of their proposed exploration work and expenditure for the initial term, together with particulars of their technical qualifications and financial resources. An application fee of \$3,000 is payable. The successful applicant is required to enter into a \$15,000 security for due compliance with the conditions of the permit and observance of the provisions of the Act. Annual rental is payable, calculated at \$15 per block, with \$300 being the minimum rental payable.

Upon the discovery of petroleum within a permit area, a 'location' of up to nine blocks including the discovery block is declared. The establishment of a location is a means of setting aside and identifying a specific number of blocks from which a Production Licence can be selected.

The holder of a permit has two years from the date the location is declared in which to apply for a Production Licence. This period may be extended for a further two years at the discretion of the Minister for Mines.

There is a specific requirement that the licensee shall carry out approved works within the licence area to the value of not less than \$100,000 per block per year. This figure may be offset in subsequent years by the value of petroleum produced in the preceding year. The term of a licence is for twenty-one years with renewal provisions. Annual rental is calculated at \$9,000 per block and a security of \$150,000 may be required.

Tenures under provisions of the Petroleum (Submerged Lands) Act 1967-1970. This Act, which came into operation on 1 April 1968, governs the exploration for and exploitation of the petroleum resources of submerged lands adjacent to the Western Australian coast comprising the Continental Shelf and the sea-bed and subsoil beneath territorial waters and is administered by the Minister for Mines as the Designated Authority for and on behalf of the State and the Commonwealth. The principal tenures available under the Act are Permits and Licences.

A permit grants to the holder, petroleum exploration rights over an area of up to 400 contiguous blocks (a block is a graticular section being five minutes of arc of latitude by five minutes of arc of longitude) which is valid for a term of six years and renewable for terms of five years over progressively reduced areas. Initially, areas are made available for application as exploration permits by advertisement in the *Government Gazette of Western Australia*. If several applications are received for a particular area, each is evaluated on its individual merits and a decision as to the grant of a permit is made accordingly. Applicants are required to submit details of their proposed exploration work and expenditure for the initial term, together with particulars of their technical qualifications and financial resources. An application fee of \$1,000 is payable. The successful applicant is required to enter into a \$5,000 security for due compliance with the conditions of the permit and observance of the provisions of the Act. Annual rental is payable, calculated at \$5 per block, with \$100 being the minimum rental payable.

Upon the discovery of petroleum within a permit area, a 'location' of up to nine blocks including the discovery block is declared. The establishment of a location is a means of setting aside and identifying a specific number of blocks from which a Production Licence can be selected.

The holder of a permit has two years from the date the location is declared in which to apply for a Production Licence. This period may be extended for a further two years at the discretion of the Designated Authority.

There is a specific requirement that the licensee shall carry out approved works within the licence area to the value of not less than \$100,000 per block per year. This figure may be offset in subsequent years by the value of petroleum produced in the preceding year. The term of a licence is for twenty-one years with renewal provisions. Annual rental is calculated at \$3,000 per block and a security of \$50,000 may be required.

Miscellaneous mining tenures. The leases and licences detailed above are those which are fundamental to mining development but there are several additional tenures which are issued in order to assist the processes of mineral extraction and treatment. These incidental tenures include rights to conserve and convey water, and to store machinery.

Forests Department

A number of licences, permits and leases are issued under the provisions of the Forests Act.

Sawmilling. Permission to cut timber in State Forests and Timber Reserves is authorised by the Conservator of Forests in the form of a Forest Produce (Sawmilling) Licence or a Sawmilling Permit. A Sawmilling Permit entitles the holder to sole cutting rights at a stipulated rate per year in respect of certain classes of timber within a defined area and for a specified period. The Forest Produce (Sawmilling) Licence differs from the Permit in that the licence does not provide for sole cutting rights to the area. In the case of softwood operations the Forests Department organises the supply of pine logs at a set rate per year to the mill landing from State plantations. Log sales are determined initially by tender or auction. Where appropriate resources are available, these licences and permits are normally renewed on an annual basis.

Each licence or permit holder is required to maintain an efficient operation and to supply the Forests Department with details of the logs taken into the mill. With regard to hardwood, a royalty is charged on the quantity of log timber which is delivered to the mill. With softwood operations the licensee is charged a rate for stumpage and cost of delivery of pine logs to the mill.

The Forests Department ensures that cutting programmes are of such a nature that the forest resources are used to the best advantage and that provision is made for forest regeneration. The Department maintains close liaison with the licence and permit holders and in the case of hardwood operations stipulates the areas where the cutting may be undertaken. Licence for woodchip logs is an example where the removal of other than millable timber assists in the process of forest regeneration.

Other licences, permits and leases. A number of other licences, permits and leases are issued by the Forests Department.

Forest Produce Licences are issued for the collection of various types of forest produce including fencing material, firewood and mining timber. There are also special provisions for the control of sandalwood operations. Some Forest Leases are granted by the Department for bush grazing and other purposes not opposed to the interests of forestry. These leases may be issued for any term not exceeding twenty years.

Permits are granted for apiary sites of an area not exceeding 1.25 hectares. They are issued to persons who are actively engaged in beekeeping and who have at least twenty-five hives of bees in the State. A permit may not be issued for an apiary site on Crown land if it is within three kilometres of a site already granted to another apiarist, and not more than four permits may be held for every fifty hives of bees owned.

LAND CLASSIFICATION

Large-scale as well as detailed soil survey measures have been developed progressively in Western Australia since the early days of settlement. Soil mapping of Crown lands in Western Australia has always been carried out as a function of the Department of Lands and Surveys. In the early years of land settlement the staff surveyors, when marking blocks, submitted classifications and commented generally on the probable yield and carrying capacity of the land, as a guide to pricing.

Modern survey techniques enable much use to be made of photogrammetric methods in the mapping and presentation of the soil survey, particularly in definition of vegetation and topographical detail such as rivers, creeks, swamps, hills, valleys, features such as rock outcrops and sand drifts, and the general contours of the land. Much topographical detail is available from the State mapping activities and this information is always used in conjunction with the field work of the soil survey.

The soils are graded into eight categories, to facilitate pricing procedure, due regard being given to the agricultural potential as determined by analysis and experimentation by the Department of Agriculture. This enables release of land in such a manner that each unit is adequate if developed on economic methods. At the same time, the soil maps assist in the overall planning for provision and extension of services such as roads, water and power supplies, townsites and all the services essential to regional development. Pastoral potential appraisements are presented with more emphasis on the grazing potential of natural vegetation in order to assess estimated carrying capacities, rather than detailed soil types.

Mapping and assessment of pastoral areas has been assisted by the use of LANDSAT earth resources satellite data and remote sensing analysis techniques. Applied use of satellite imagery in pastoral and other resource management studies has been co-ordinated through the Office of the Surveyor General.

In addition to the soil and pastoral mapping surveys which are carried out under the direction of the Surveyor General, similar methods are used by other Government Authorities and private organisations, for forestry assessment, classification and control, and for geological mapping.

It has been estimated by the Surveyor General that, of the State's total area of 2,525,500 square kilometres about 11 per cent is taken up by the agricultural areas, 52 per cent by the pastoral regions and the remaining 37 per cent by practically unoccupied areas of the interior. Soil mapping investigations have enabled a broad assessment of the total area and a detailed assessment of the bulk of the agricultural areas and pastoral regions.

OCCUPATION OF LAND

The following table shows, for a selection of years during the period from 1900 to 1981, the areas of land absolutely alienated or in process of alienation and of Crown land held under certain types of lease or licence. For the years 1900, 1910 and 1920 the basis of classification according to Department has been made to conform to current practice in the issue of leases and licences. For example, tenures relating to forests, which were originally issued by the Department of Lands and Surveys and later by the Department of Mines, have been shown for those years under the heading of Forests Department. For 1930 and later years the figures are as recorded by the Departments concerned. The types of tenure included under the several departmental headings are indicated in the footnotes to the table.

LAND ALIENATED AND LAND HELD UNDER LEASE
(^{'000 hectares})

At 31 December —	Area absolutely alienated	Area in process of alienation	Area of leases or licences in force on Crown land and issued by —			
			Department of Lands and Surveys		Department of Mines (b)	Forests Department (c)
			Pastoral leases	Other leases (a)		
1900	1,401	1,278	34,977	4	34	345
1910	1,835	5,551	67,203	224	43	522
1920	3,623	5,958	104,420	999	42	664
1930	5,937	8,610	90,693	358	34	539
1940	7,408	5,602	82,875	843	38	954
1950	8,727	4,788	(d) 79,212	1,400	41	1,448
1960	11,158	5,185	88,301	2,685	37	1,617
1970	13,929	5,832	98,982	2,548	49	1,377
1976	15,504	3,182	96,061	2,653	127	1,212
1977	15,880	2,843	95,501	2,662	117	1,080
1978	16,225	2,554	95,547	2,820	118	833
1979	16,519	2,386	93,865	2,233	142	833
1980	16,807	2,151	95,066	2,097	142	833
1981	17,112	1,958	95,117	2,096	158	616

(a) Comprises special leases, leases of reserves, leases of residential lots and perpetual leases.
 (b) Comprises gold-mining leases, mineral leases and miners' homestead leases. (c) Predominantly sawmilling permits. Includes permits for cutting wandoo for tannin extraction, but excludes permits and licences for cutting timber and firewood in Goldfields areas. (d) Apparent decrease in area due mainly to revision in the records of the Department of Lands and Surveys.

Land which is shown as 'absolutely alienated' consists mainly of farming areas, acquired originally as conditional purchase leases and subsequently alienated under Crown grant. While held under lease prior to alienation they account for most of the land shown as 'in process of alienation'. These two sets of figures taken together consequently give a broad indication of the increased use of land for agricultural purposes during the period under review. Similarly, variations in the area occupied as sheep and cattle stations may be gauged by reference to the area of pastoral leases issued by the Department of Lands and Surveys.

The passing of the Homesteads Act in 1893 and of a comprehensive Land Act in 1898 provided the basis for a rapid increase in the settlement of agricultural land. Under the Homesteads Act, any man over the age of eighteen years who did not already own an area of 40.5 hectares or more in this State could apply for a free homestead farm of 64.7 hectares, on condition that he resided on his land during at least six months of each of the first five years and carried out prescribed improvements. With a lower minimum age of sixteen years, a similar provision is contained in the *Land Act 1933-1980*, and this provision, operating in conjunction with the conditional purchase lease system, has also been a factor in the increase in land settlement, particularly in the wheat-growing areas.

About 1905 the Department of Lands and Surveys, by implementing a system of survey and subdivision before selection, partially checked the indiscriminate selection of land by inexperienced farmers. A further stabilising influence on agricultural development was the introduction in 1909 of a system of grading Crown lands into classes, First, Second and Third according to suitability for farming.

The movement of population from the goldfields to the wheat belt contributed to the increase in the area of land in process of alienation from 1,277,512 hectares in 1900 to 5,550,573 in 1910. The ultimate alienation of about one-third of this land by Crown grant is reflected in the greatly increased figures for 'absolutely alienated' land in 1920. Settlement of the wheat belt developed rapidly during and after the period 1910 to 1920, in spite of serious droughts which occurred in 1911 and 1914. Although the increased totals at 31 December 1930 were principally due to this development, they resulted in part from the acquisition during the previous ten years of farmland, mainly for dairying, in the south-west of the State under the

Group Settlement Scheme. These holdings were individually much smaller than those in the wheat-growing districts, because of the type of farming and the heavy clearing costs, but the numbers involved made the total area taken up under the Scheme of some significance.

Pastoral leases, which comprise the greatest proportion of Crown land held under lease or licence, increased threefold between 1900 and 1920. The area actually held under pastoral lease conditions represents approximately one-third of the whole State. The aggregate area of gold-mining leases, mineral leases and miners' homestead leases, appearing in the table under the heading of Department of Mines, shows comparatively little variation since 1900. However, in recent years very large areas have been included in tenures issued under the provisions of the Petroleum Act and in temporary reserves under the Mining Act.

From 1930 the demand for land for agricultural purposes declined considerably, the principal reason being the lower farm commodity prices which prevailed for several years prior to the second World War. After 1945, however, the demand for land again increased, stimulated by the sharp rise in export prices, notably of wheat and wool, and later by the War Service Land Settlement Scheme. The area conditionally alienated in any one year reached a post-war peak of 691,161 hectares in 1953. During the next decade the area fluctuated between 285,657 hectares in 1956 and 499,591 hectares in 1962. The area then declined and by 1972 the area conditionally alienated was only 4,176 hectares, owing to restrictions imposed on the release of Crown land by conditional purchase. There has been a slight recovery in areas alienated in subsequent years but the annual totals have been less than 100,000 hectares.

The following table gives details of areas of land for which applications were approved, during each of the years 1976 to 1981, by the Department of Lands and Surveys for conditional alienation or allocation under lease or licence. The figures shown for any year do not necessarily represent land allotted for the first time, as they may include land previously held under any of the several forms of land tenure.

CROWN LANDS — AREA OF ALLOCATIONS
APPROVED BY DEPARTMENT OF LANDS AND SURVEYS
(Hectares)

Particulars	1976	1977	1978	1979	1980	1981
Conditional alienations —						
Conditional purchase	33,753	35,138	55,378	89,279	47,278	54,935
Town and suburban lots	109	126	140	271	205	337
Miscellaneous (a)	1,376	1,850	811	859	1,144	(b) 25,599
Total	35,238	37,115	56,329	90,409	48,627	80,871
Leases and licences —						
Pastoral leases and licences	623,449	297,195	1,004,166	196,350	248,690	319,118
Special leases	23,304	54,942	344,779	14,292	49,887	15,421
Miscellaneous leases (c)	194,198	17,230	14,114	184,555	32,179	47,578
Total	840,951	369,368	1,363,059	395,197	330,756	382,117

(a) Comprises free homestead farms and reserves. (b) Includes 21,130 hectares reserved for the Derby Airfield Defence Area. (c) Comprises perpetual leases, leases of reserves and leases of town and suburban lots.

GOVERNMENT LAND SETTLEMENT SCHEMES

Although, generally, the method of land alienation and settlement in the agricultural areas of Western Australia has been by independent applications by individual settlers for conditional purchase leases, there has also been a series of government land settlement schemes. The more important of these are the Soldiers' Settlement Scheme following the 1914-18 war, the Group Settlement Scheme introduced in 1921, the War Service Land Settlement Scheme which was initiated in 1945 and other lesser schemes for the settlement of civilians. An outline of each of these schemes appears in Chapter VII of the 1976 issue of the Year Book.

No government land settlement schemes are currently in operation. Activities in respect of the most recent of the schemes, the War Service Land Settlement Scheme, were officially terminated on 31 August 1966 when the main developmental work was completed.

Chapter VII—continued

Part 2 — Water Supply and Sewerage

The principal water supply and sewerage systems of Western Australia are under the control of two State authorities, the Metropolitan Water Supply, Sewerage, and Drainage Board and the Public Works Department.

As at 30 June 1982 the Metropolitan Water Supply, Sewerage, and Drainage Board was constituted under the provisions of the *Metropolitan Water Supply, Sewerage, and Drainage Act 1909-1981*. It came into being on 1 July 1964 and replaced the former Metropolitan Water Supply, Sewerage and Drainage Department as the authority responsible, subject to the Minister, for the general administration of the Act. The Board consists of seven members. One member is appointed Chairman on the nomination of the Governor and the remaining members comprise the Commissioner of the Board; a qualified engineer; the Under-Treasurer or an officer of the Treasury nominated by him; and three appointees on the nomination of the Minister, one of whom represents the ratepayers of the City of Perth, the remaining two representing the ratepayers of the balance of municipal districts within the Metropolitan Water, Sewerage and Drainage Area. This area of approximately 5,040 square kilometres constitutes the territory under the Board's administration. It embraces Perth and the metropolitan area southward to Warnbro Beach and Serpentine, northward to Gingin Brook and Herne Hill and eastward to Swan View-Sawyers Valley, Kalamunda, Bickley and Carmel, and also incorporates approximately 2,100 square kilometres of the water catchment areas of the Canning, Serpentine, North Dandalup and South Dandalup Rivers and streams of the Darling Range.

The Public Works Department controls the Goldfields and Agricultural Areas Water Supply and the Great Southern Towns Water Supply as well as the water supplies to ninety-eight towns from local water supplies and forty-two towns from twelve regional supplies. It also provides water for irrigation purposes in the four South-West Irrigation Districts (Waroona, Harvey, Collie River and Preston Valley), the Camballin Irrigation District and the Ord Irrigation District. In addition, the Carnarvon and Gascoyne Groundwater Supply Scheme supplying about 160 growers in the Carnarvon Non-Artesian Area is being operated.

Five independent town schemes are controlled by local Water Boards in country areas under the *Water Boards Act 1904-1979* and some local authorities supply water under the provisions of the *Local Government Act 1960-1981*. Private companies engaged in mining in the north-west of the State provide their own water supply for mining operations, power supply and domestic use. Individual water supplies serve railways, timber mill towns, isolated mines, pastoral properties, stock routes and agricultural areas, mainly from dams, tanks, wells and bores.

The principal water storages in Western Australia are shown in the next table. Supplies for the metropolitan area and environs are drawn from both surface and underground sources. The surface storages include Serpentine Reservoir and Serpentine Pipehead Reservoir, Canning Reservoir, Wungong Reservoir, Churchman Brook Reservoir, Victoria Reservoir, North Dandalup Pipehead Dam and South Dandalup Reservoir. Groundwater is drawn from the shallow unconfined aquifers north and south of the Swan River. Water from these aquifers is treated in four water treatment plants at Mirrabooka, Gwelup, Wanneroo and Jandakot. The

supplies are supplemented with artesian water from deep confined aquifers. Mundaring Weir, which is the source for the Goldfields and Agricultural Water Supply, is linked to Kalgoorlie by pipeline and serves the more populous parts of the Eastern Goldfields as well as certain towns and farming areas north and south of the main pipeline. As occasion arises Mundaring Weir supplies to or draws from the Metropolitan Water Supply. Stirling Dam, upstream of the Harvey Weir, is used to augment this weir which is principally used for irrigation but is also used by the Harvey Water Board for domestic use in the town of Harvey. Similarly, Samson Brook Dam is mainly used for irrigation purposes, but water is drawn from a pipehead dam near the town of Waroona for the town water supply. Drakesbrook Dam, Logue Brook Dam, Waroona Dam and Glen Mervyn Dam are used solely for irrigation of areas in the south-west. Wellington Dam, on the Collie River supplies water to the southern part of the irrigation area, as well as towns and farmlands in the Great Southern Towns Water Supply Area and the southern portion of the comprehensive scheme area.

DAMS AND RESERVOIRS — STORAGE CAPACITY (a)
(‘000 cubic metres)

Dam or reservoir	Storage capacity	Dam or reservoir	Storage capacity
Canning Reservoir (b)	90,500	Samson Brook Dam	9,170
Churchman Brook Reservoir	2,160	Serpentine Pipehead Reservoir	2,637
Drakesbrook Dam	2,290	Serpentine Reservoir	184,880
Fitzroy Dam	4,650	17-Mile Dam (e)	5,490
Glen Mervyn Dam	1,490	South Dandalup Reservoir	208,000
Harvey Weir	9,130	Stirling Dam	57,000
Kununurra Diversion Dam (c)	97,400	Victoria Reservoir	859
Logue Brook Dam	24,300	Waroona Dam	14,900
Mundaring Weir	77,000	Wellington Dam	185,000
North Dandalup Pipehead Dam	(d)	Wungong Reservoir	60,000
Ord River Dam (Lake Argyle)	5,720,000		

(a) At 30 June 1981. (b) Capacity revised following re-survey of site. (c) Ord River Diversion Dam. (d) Diversion weir only. (e) On Uralla Creek, an anabranch of the Fitzroy River.

METROPOLITAN WATER SUPPLY

The sources of the metropolitan water supply are South Dandalup Reservoir, Serpentine Reservoir and Serpentine Pipehead Reservoir, Canning Reservoir, Wungong Reservoir, Churchman Brook Reservoir, Victoria Reservoir, North Dandalup Pipehead Dam, groundwater from the shallow unconfined aquifers of the Swan Coastal Plain and artesian water from the deep confined aquifers. The supply from these sources is supplemented as necessary from a pipeline link with Mundaring Weir. Groundwater used to augment hills supplies amounted to 60,770,400 cubic metres in 1980-81 and represented 40.0 per cent of the total output from all sources, compared with 60,522,100 cubic metres and 42.0 per cent during 1979-80.

METROPOLITAN WATER SUPPLY — QUANTITIES OF WATER DRAWN (a)
(‘000 cubic metres)

Source	1975-76	1976-77 (b)	1977-78 (c)	1978-79 (d)	1979-80	1980-81
Canning Reservoir	54,813	19,932	4,161	15,008	24,563	13,851
Churchman Brook Reservoir	3,187	1,896	616	2,052	1,889	2,407
Mundaring Weir	4,103	1,290	(e) —2,908	1,187	1,247	1,641
North Dandalup Pipehead Dam	7,781	4,684	6,464	8,483	5,701	11,586
Serpentine Reservoir (f)	67,281	73,324	15,235	30,508	32,068	31,538
South Dandalup Reservoir	16,430	33,432	29,228	10,300	16,226	14,780
Victoria Reservoir	3,669	1,361	1,528	1,942	578	2,855
Wungong Reservoir (g)	7,249	2,820	1,765	2,933	—	11,359
Metropolitan bores (h)	31,017	36,714	52,850	48,363	60,522	60,770
Total	195,530	175,453	108,939	120,778	142,797	150,788

(a) Including supplies to railways and shipping. (b) Decreased quantities drawn mainly as a result of a publicity campaign to save water. (c) Water restrictions in force from July 1977. (d) Water restrictions eased. (e) Amount of water pumped into Mundaring Weir in excess of draw. (f) Includes water drawn from Serpentine Pipehead Reservoir. (g) Wungong was developed as a pipehead dam prior to the building of Wungong Dam. (h) Includes shallow underground water.

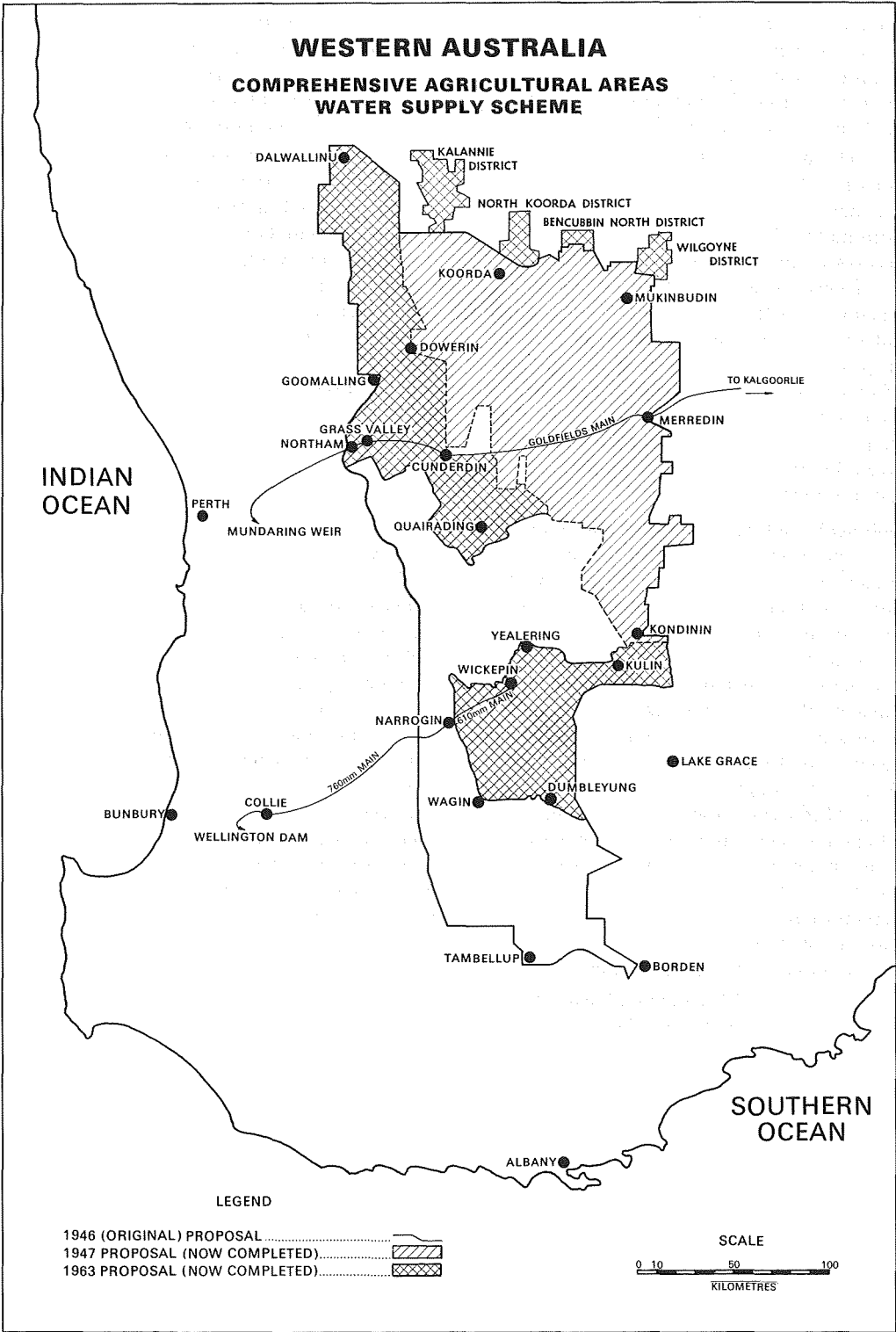
Victoria Reservoir, which was completed in 1891 with a capacity of 859,000 cubic metres, was the first of the existing water conservation projects to be completed in the Darling Range. In 1921 a 104,500 cubic metre reservoir, which is no longer used for water supply, was constructed at Bickley Brook to replace a pipehead dam, and in 1928 one with a capacity of 2,182,000 cubic metres was completed at Churchman Brook. During the same period pipehead dams were built across the upper course of the Canning River and its tributary, Wungong Brook, preliminary to the construction of Canning Reservoir, which was begun in 1933 and completed in 1940. Canning Reservoir has a storage capacity of 90,500,000 cubic metres retained by a concrete wall 66 metres high and 468 metres long at the crest. Serpentine Pipehead Reservoir was completed in 1957 and Serpentine Reservoir, commenced in 1957, was completed in 1961. Serpentine Reservoir is constructed of rolled earth fill and the embankment rises 52 metres above the stream bed, the length at the crest being 424 metres. Its capacity, which is slightly less than that of Wellington Dam on the Collie River, is 184,882,000 cubic metres. Supplies to the metropolitan system are augmented by the North Dandalup Pipehead Dam which is the first stage of the Dandalup Rivers Scheme and was completed in December 1970. The major storage component of the scheme, the 208,211,000 cubic metre capacity South Dandalup Dam, was completed in late 1973. Wungong Reservoir, with a capacity of 60,000,000 cubic metres, was completed in 1980. The dam was built near the site of the old pipehead dam.

Water from storages in the Darling Range is conveyed to the metropolitan area by the Canning Tunnel, which was commissioned on 17 January 1975, and large trunk mains. It is then distributed by feeder, distribution and reticulation mains, either directly from the trunk main or from large storage service reservoirs at Mount Yokine, Mount Eliza, Bold Park, Mount Hawthorn, Richmond, Melville, Buckland Hill, Hamilton Hill, Thompson Lake, Greenmount, Mirrabooka, Wanneroo, Whitfords and Tamworth Hill and from summit tanks and water towers situated at high points throughout the area supplied. The Canning Tunnel is designed to help meet the peak summer demand for water by producing a high capacity link to Canning Dam. A tunnel is also being constructed to Wungong Reservoir to increase the outlet capacity from that dam. In addition, groundwater from shallow confined and unconfined aquifers of the Gnangara Mound is distributed, after treatment, into the supply system. The groundwater is treated at water treatment plants situated at Gwelup, Mirrabooka, Wanneroo and Jandakot which have the capacity to produce 225,000 cubic metres of clear water daily. To meet the peak demand during the summer months, supplies from these sources are supplemented from a system of artesian bores which can provide a daily maximum of 95,500 cubic metres. At 30 June 1981 the number of consumer services was 297,000.

COUNTRY WATER SUPPLIES

Supplies controlled by the Public Works Department

Since 1947 enlargement and extension of the Goldfields and Agricultural Areas Water Supply and the development of the Great Southern Towns Water Supply have been carried out mainly in accordance with a project known as the Modified Comprehensive Scheme. A proposal for a comprehensive water supply scheme was first submitted by the State Government to the Commonwealth Government in January 1946 when applying for financial assistance in its construction. The initial plan was intended to supply water to towns and farms in an area of 4.7 million hectares in mixed farming (cereal and sheep) districts of Western Australia, as well as to increase the supply to the Eastern Goldfields. A committee appointed by the Commonwealth Government to consider the State's submission reported that certain areas within the scheme had a higher priority than others. As a result, the project was greatly reduced in scope and a modified scheme, to embrace 1.7 million hectares, was agreed to by both Governments and adopted in October 1947. The extent of the scheme as originally proposed, and as modified, is shown on the following map. A description of the boundary of the modified scheme is



contained in a schedule to the *Agricultural Areas, Great Southern Towns, and Goldfields Water Supply Act 1947* (State), which gave parliamentary approval of the undertaking. Commonwealth financial aid was provided by means of the *Western Australia Grant (Water Supply) Act 1948* (Commonwealth) and later amendments, which authorised reimbursement to the State of one-half of its expenditure on the scheme, up to a maximum grant of \$10 million.

The modified scheme was completed in 1961, the total expenditure amounting to \$20.6 million. A request made by the State Government in 1960 for a grant equal to half the cost of extending the scheme virtually to the boundary as first proposed in 1946 was rejected by the Commonwealth Government. Following this rejection the State Government embarked on a necessarily limited programme financed from its own loan moneys, the policy being to restrict extensions to supply certain towns within the original area and farm lands adjacent to pipelines. A further request was made by the State Government in 1963 for a grant of \$10.5 million payable over a seven-year period and representing one-half of the estimated cost of proposed extensions which would increase by 1.5 million hectares the area served by the scheme. The Commonwealth Government agreed to provide assistance in the form of an interest-bearing loan up to a maximum of \$10.5 million, advances to be made during a period of eight years commencing with the financial year 1965-66. Legislative authority for the loan was given by the *Western Australia (South-west Region Water Supplies) Agreement Act 1965* (Commonwealth).

Goldfields and Agricultural Areas Water Supply

The original purpose of this undertaking, which was formerly known as the Goldfields Water Supply was to supply water for the Coolgardie and the Kalgoorlie-Boulder areas. To provide conservation, the Helena River was dammed near Mundaring, and on completion of the reservoir in 1902 it had a capacity of 21 million cubic metres. The increasing demand for water in the area served made it necessary to augment supplies. This was achieved by raising the wall 9.8 metres to a height of 40.2 metres and when the work was completed in 1951 the enlarged capacity of the reservoir was 68.9 million cubic metres. The capacity has since been further increased to 77.0 million cubic metres by the erection of adjustable steel crest gates 1.2 metres in height. In 1972 the Lower Helena Pipehead Dam, some eight kilometres below Mundaring Weir, was brought into operation, water being pumped from this source to augment the supply from Mundaring reservoir. The main pipeline between Mundaring and Kalgoorlie is 554 kilometres long. It is for the most part 762 millimetre diameter steel but has 1,219 millimetre, 1,067 millimetre and 914 millimetre pipe in the western portion with some duplication of the 762 and 914 millimetre pipe. There are sixteen pumping stations along the main pipeline. The maximum pumping capacity from Mundaring Weir is 134,000 cubic metres per day. The total capacity of all receiving, regulating, standby and service tanks (including four standby reservoirs at Kalgoorlie with a combined capacity of 336,000 cubic metres) is 1.2 million cubic metres.

At 30 June 1981 the Goldfields and Agricultural Areas Water Supply was serving ninety-three towns and water was being reticulated to farms in an area of 2.65 million hectares.

GOLDFIELDS AND AGRICULTURAL AREAS WATER SUPPLY

Year	Number of services	Length of water mains (kilometres)	Consumption (a) ('000 cubic metres)					
			Domestic	Commercial	Industrial (including railways)	Mining	Farms and market gardens	Other
1975-76	27,942	7,940	6,438	930	1,100	3,986	4,955	2,488
1976-77	28,094	7,932	6,977	1,034	1,077	1,102	5,137	5,002
1977-78	27,853	8,022	4,359	746	771	1,102	3,753	4,255
1978-79	28,600	8,035	5,151	785	834	1,548	3,996	3,578
1979-80	28,889	8,052	6,380	847	712	1,344	4,989	3,875
1980-81	27,849	7,922	6,283	922	667	1,702	4,573	4,665

(a) Figures include amounts consumed from local supplies at Waddouring-Barbalin-Knungajin, Bruce Rock, Naremben and Kondinin.

Extensions to country towns and agricultural areas have been made from several points along the main pipeline. Norseman is connected by an extension southward from Coolgardie. A branch from this main supplies the nickel mining town of Kambalda. From two points west of Merredin, water is taken northward to supplement local schemes at Waddouring-Barbalin-Knungajin. Other extensions north and south of the main pipeline provide water for a number of towns and surrounding districts, including Toodyay, Goomalling, York, Beverley and Bullfinch. A pipeline southward from Merredin to serve Bruce Rock, Narembeen, Kondinin, Corrigin and surrounding districts is linked to an extension south from Doodlakine. A main south from Cunderdin serves Quairading and the intermediate farmlands. Areas north-west of Burracoppin are served by an extension northward from a point east of Merredin, and districts north of Kellerberrin by a pipeline connecting Kellerberrin to the Waddouring-Barbalin-Knungajin system already mentioned. Water is taken northward from Cunderdin through Minnivale to a point near Kokardine. Extensions westward, eastward and northward from this pipeline serve a number of towns and localities, including Dowerin, Wyalkatchem, Yelbeni, Koorda, Kalannie, Pithara, Ballidu, Dalwallinu, Wubin and Wongan Hills, and surrounding farmlands. From a point on the main pipeline east of Southern Cross an extension northward serves Koolyanobbing, where iron ore is mined, while an extension southward serves Marvel Loch and adjacent farmlands.

Great Southern Towns Water Supply

The Great Southern Towns Water Supply serves towns on the Great Southern Railway from Brookton to Katanning, as well as a number of other towns. Water is drawn from Wellington Dam which also supplies the Collie River Irrigation District. Work on raising the wall of the dam to give it a holding capacity of some 185 million cubic metres was completed in 1960. Water is taken through Narrogin to Wickepin by means of a main pipeline 171 kilometres long. In addition to the pumping installation at the dam site, there are stations at a point forty-five kilometres east of the dam and at Narrogin. From Narrogin, pipelines extend sixty-four kilometres northward to Brookton, ninety-five kilometres southward to Katanning and eastward to Wickepin and Kulin. Branch lines from this latter line extend northwards to take in the towns of Yealering, Bullaring, Kondinin and Bendering and southwards to Dumbleyung, Moulyinning, Dudinin, Harrismith and Lake Grace. A branch westward from Katanning serves the town of Kojonup and a second branch extends south-eastward through Broomehill to Gnowangerup. A pipeline eighteen kilometres long supplies water to a power station constructed for the State Energy Commission at Muja, south-eastward from Collie.

At 30 June 1981 the Great Southern Towns Water Supply was serving thirty-one towns and an area comprising 607,000 hectares of farmland. Details of the number of services, length of water mains and consumption for the years 1975-76 to 1980-81 are given in the following table.

GREAT SOUTHERN TOWNS WATER SUPPLY

Year	Number of services	Length of water mains (kilometres)	Consumption ('000 cubic metres)					Total
			Domestic	Commercial	Industrial (including railways)	Farms and market gardens	Other (a)	
1975-76	11,191	1,918	2,448	263	802	791	475	4,778
1976-77	11,384	1,923	2,743	262	597	1,671	543	5,816
1977-78	11,477	1,968	2,667	280	483	927	553	4,910
1978-79	11,630	1,977	2,606	261	487	927	429	4,710
1979-80	12,167	2,136	2,785	290	507	976	648	5,206
1980-81	12,824	2,294	2,748	306	374	981	721	5,130

(a) Excludes mining, for which no services were provided by the Public Works Department.

Supplies to other Country Towns

One hundred and forty towns are supplied with water from stream flow, dams, tanks, wells and bores, the schemes being administered under the provisions of the *Country Areas Water Supply Act 1947-1981*.

The Public Works Department is also responsible for the provision and maintenance of tanks and wells as a source of cartage water for a number of small communities in gold mining and agricultural areas.

PUBLIC WORKS DEPARTMENT: LOCAL AND REGIONAL SCHEMES

Year	Number of services	Length of water mains (kilometres)	Consumption ('000 cubic metres)						Total
			Domestic	Commercial	Industrial (including railways)	Mining	Farms and market gardens	Other	
1975-76	43.387	2.717	15.675	4.529	2.964	237	319	10.863	34.587
1976-77	45.739	2.832	17.344	4.059	2.837	218	294	14.124	38.876
1977-78	48.132	3.043	17.543	4.870	1.632	270	349	13.311	37.975
1978-79	51.425	3.100	18.463	4.460	2.664	197	329	13.032	39.145
1979-80	54.171	3.348	20.032	4.420	2.873	317	411	13.620	41.673
1980-81	57.201	3.450	20.395	4.430	2.609	270	440	13.346	41.491

Other Country Water Supplies

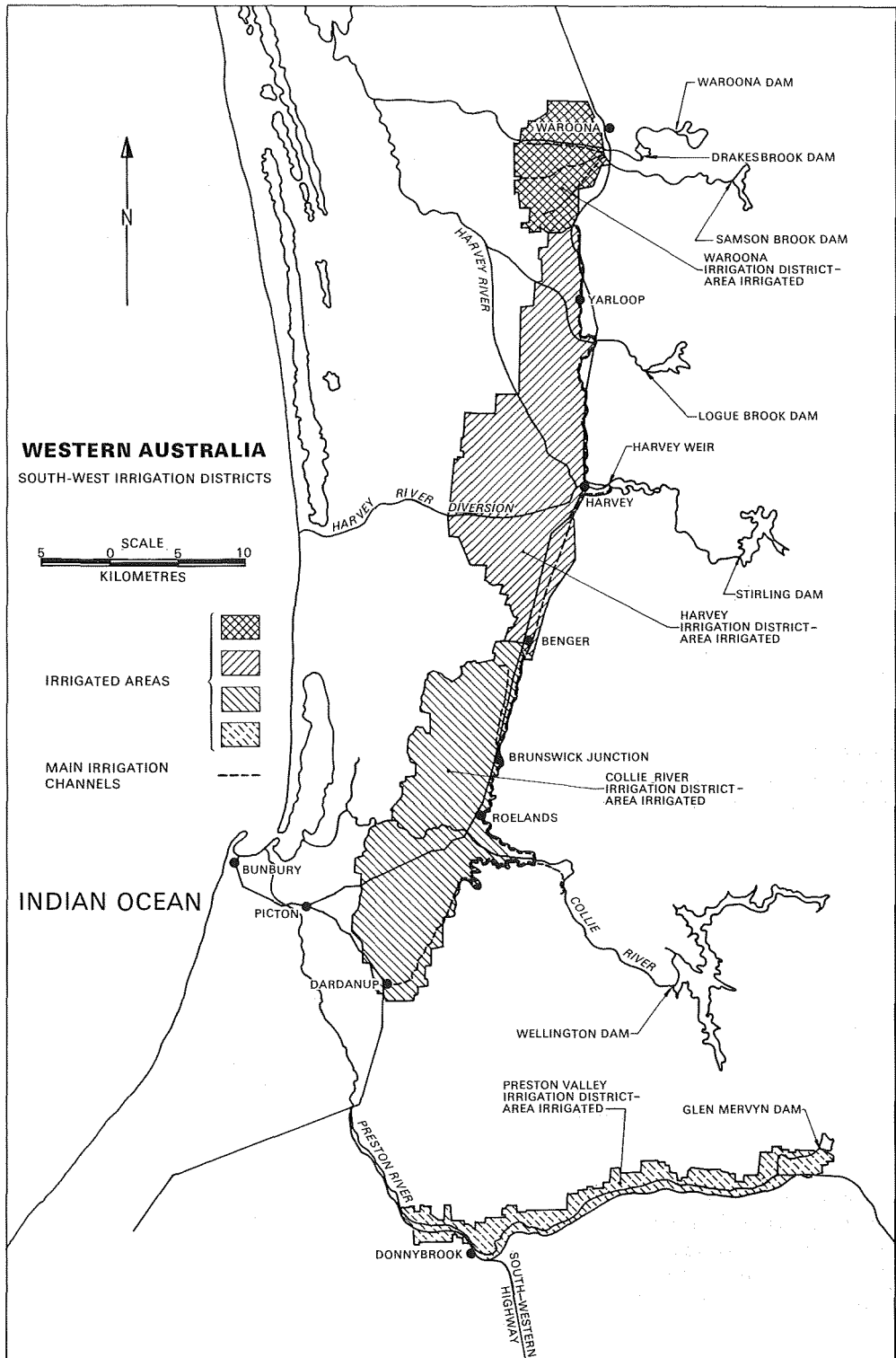
As well as the schemes controlled by the Public Works Department, there are five local Water Boards operating under the *Water Boards Act 1904-1979* which also draw supplies from stream flow, dams, tanks, wells and bores. In addition, some local authorities exercise powers under the *Local Government Act 1960-1981* to supply water within their boundaries. There are still, however, a large number of individual farms and pastoral stations which are not connected to public schemes and are therefore obliged to provide their own supplies. Low interest government loans are available to farmers in prescribed areas to secure on-farm water supplies. The Forests Department and sawmilling companies operate schemes to supply water to their mill towns. In a number of ports and mining towns in the north-west of the State, mining companies are responsible for the provision of their own water supplies, and while the principal source of supply is underground reserves, desalination of sea water is also being used.

The use of water by railways of the Commonwealth Government and State Government has decreased with the replacement of steam locomotives by diesel. The majority of the former railway dams have been handed over to the Public Works Department and have been incorporated into the various schemes for use as town water supplies, farmland reticulation and agricultural water carting sources. Water consumed by the railways is obtained from supplies controlled by the Metropolitan Water Supply, Sewerage, and Drainage Board and the Public Works Department.

Numerous rivers and river systems throughout the State have been proclaimed by the Governor in Council vesting in the Crown the right to use and control surface water. The proclamation confirms the entitlement of landowners bordering rivers to divert water for stock and domestic requirements, and provides the power for the Government to control stream diversions by licence. Currently the licensing is restricted to those pumping from rivers downstream of major water supply storages and those areas where there have been numerous disputes involving a number of landowners.

GROUNDWATER

Considerable use is made of groundwater by individual farmers, pastoralists, market gardeners, etc. and it is estimated that over 92,000 bores are in use in the State. The quality of the water varies from place to place and much of it is too saline for irrigation or even stock. Both pressure waters and non-pressure waters are used to supply or augment the supplies of numerous towns,



including such major centres as Perth, Albany, Bunbury, Busselton, Carnarvon, Dampier, Esperance, Exmouth, Geraldton, Karratha and Port Hedland. In a number of ports and mining towns in the north-west (e.g. Paraburdoo, Tom Price and Newman) mining companies are responsible for the provision of their own water supplies.

Industries also are using groundwater in substantial quantities, particularly in the processing of titanium, iron, and alumina. Recent mineral discoveries in several areas have given rise to very large demands for water, the search for which has had to be intensified. Marked advances in the knowledge of aquifers and quality of water in the main sedimentary basins have been made as a result of extensive geological surveys and exploratory drilling by the Geological Survey (a branch of the Department of Mines), several oil companies, the Public Works Department and the Metropolitan Water Supply, Sewerage, and Drainage Board.

Under the *Rights in Water and Irrigation Act 1914-1978* a licence is required for an artesian bore anywhere within the State, and for any non-artesian bore within a Proclaimed Area. Currently there are twenty-five proclaimed groundwater areas between Esperance and Camballin. In general, licensing has been introduced in order to ensure the overall orderly development of certain areas, to protect town water supplies dependent on groundwater resources, and to secure domestic and stock water supply requirements while catering to the extent possible for the integrated industrial, agricultural, recreational and environmental needs of the region.

The Public Works Department and the Metropolitan Water Supply, Sewerage, and Drainage Board are responsible for all developmental works and exploration for their own supplies. The Geological Survey is responsible for exploratory work, as well as for investigating and assessing the State's groundwater resources, and advising local government authorities, private industry and individuals on groundwater problems.

SOUTH-WEST IRRIGATION SCHEMES

Irrigation schemes have been established by the State Government on the coastal plain south of Perth in the Waroona, Harvey, Collie River and Preston Valley Irrigation Districts between Waroona and Donnybrook, the water being channelled from dams in the adjacent Darling Range. The areas irrigated and main irrigation channels in each Irrigation District at 30 June 1981 are shown on the preceding map, together with the relevant dams.

Specialist advice on irrigation farming methods is available through the Department of Agriculture and the properties are watered according to requirements and water availability.

The Harvey Irrigation District, opened in 1916, was the first large-scale project. Harvey Weir, with a capacity of 2.36 million cubic metres on completion, was constructed as the source of water supply and the service initially provided was for 1,215 hectares of land for citrus growing.

The success of dairying and stock raising and to a lesser extent vegetable growing, which have replaced citrus culture, has led to gradual but substantial extensions of the south-west irrigation area. The damming of Drakes Brook in 1931 and Samson Brook in 1941 provided a storage capacity of 10.37 million cubic metres which, by alterations to Samson Brook Dam in 1960, has been increased to 11.46 million cubic metres and is used for the irrigation of 1,515 rated hectares in the Waroona Irrigation District. In 1966 a third storage to serve the Waroona District, known as Waroona Dam, was completed on Drakes Brook about five kilometres up-stream from the existing Drakesbrook Dam. Its capacity is 14.90 million cubic metres. In 1931 the capacity of Harvey Weir was enlarged to 9.13 million cubic metres (including flashboard storage) and in 1948 Stirling Dam, with an original capacity of 54.83 million cubic metres (increased to 57.00 million cubic metres by alterations in 1958), was completed further up-stream on the Harvey River. These works enabled the Harvey Irrigation District to be

extended northward to link with the Waroona District. Logue Brook Dam, with a capacity of 24.30 million cubic metres, was completed in 1963 and provides additional supplies for the Harvey Irrigation District, the rated area of which is 5,584 hectares.

Details of irrigation in each district in the years 1979-80 and 1980-81 are given in the accompanying table. Similar information relating to northern irrigation schemes embracing the Ord and Camballin Irrigation Districts appears later in this Part.

IRRIGATION: SOUTH-WEST SCHEMES

Particulars		Irrigation district (a)									
		Waroona		Harvey		Collie River		Preston Valley		Total	
		1979-80	1980-81	1979-80	1980-81	1979-80	1980-81	1979-80	1980-81	1979-80	1980-81
Area watered	hectares	1,731	1,789	5,475	5,557	5,464	6,262	505	474	13,175	14,082
Pasture	"	1,052	1,196	5,306	5,349	5,436	6,215	3	3	11,797	12,763
Fodder crops	"	132	103	62	86	23	36	—	—	217	225
Potatoes	"	—	—	5	16	—	1	62	48	67	65
Other vegetables	"	80	67	26	43	3	10	4	11	113	131
Orchards	"	—	—	76	63	2	—	439	411	517	474
Hectare waterings (b)		9,796	10,786	27,413	36,336	35,694	38,614	1,688	1,705	74,591	87,441
Average number of waterings (c)		5.7	6.0	5.0	6.5	6.5	6.2	3.3	3.6	5.7	6.2
Total water gauged at entry to district	'000 cu m	13,590	13,608	39,874	47,970	51,926	55,395	802	1,025	106,192	117,998
Dam capacity (d)	"	26,360	26,360	90,430	90,430	185,000	185,000	1,490	1,490	303,280	303,280
Length of channels	km	76	76	285	285	267	267	..	..	628	628

(a) See map: South-West Irrigation Districts. (b) Area watered multiplied by number of waterings. Figures are the sum of hectare waterings for individual holdings in each district. (c) Total hectare waterings divided by total area watered. (d) Includes flashboard storage.

During 1969 construction of the Glen Mervyn Dam on a tributary of the Preston River near Mumballup was completed. Water from this dam is made available each summer for controlled release into the Preston River when the natural stream flow is insufficient for the irrigation of orchards downstream from Donnybrook.

Concurrently with developments in the Harvey and Waroona Irrigation Districts, action was taken to conserve water for the Collie River Irrigation District and Wellington Dam on the Collie River was completed in 1933. In view of its importance, not only to irrigation projects but also to the Great Southern Towns Water Supply, the wall of this reservoir has been raised and when work was completed in 1960 its capacity of 36.37 million cubic metres was increased to 185 million cubic metres. It serves an area of 4,940 rated hectares in the Collie River Irrigation District, which extends from Brunswick Junction to Dardanup.

NORTHERN IRRIGATION SCHEMES

Carnarvon. A thriving plantation industry has developed at Carnarvon which is situated near the mouth of the Gascoyne River. This centre is one of the major producers in Western Australia of tomatoes, watermelons, pumpkins, cucumbers, capsicums and runner beans. Carnarvon also exports capsicums, zucchinis and pumpkins to the Eastern States. It produces over half the bananas consumed in Western Australia as well as limited supplies of citrus fruit, mangoes and avocados.

The rainfall at Carnarvon is extremely variable and averages little more than 230 millimetres per annum. Agricultural development has been made possible only by irrigation. Water is obtained from the growers' own irrigation pumping plants and from the Government-controlled Carnarvon Groundwater Supply Scheme which is supplied from bores along the Gascoyne River extending between points twenty kilometres and fifty-two kilometres upstream from the mouth of the river. More than 60 per cent of water used for irrigation is now supplied from this Scheme. Usually the river bed is exposed as surface flows of the Gascoyne River do not occur regularly each year. Wells and bores are sunk into the river sands

and the water obtained is pumped either into storage tanks or direct to plantation channels and pipes from which it is distributed to the growing plants by bays or furrows. Limitation of supply from the river sands has led to the State Government instituting control over the quantity and quality of water pumped, and the up-river sources have been developed to bring additional supplies of water into the irrigation area.

The Gascoyne Research Station is maintained at Carnarvon by the Department of Agriculture. Early activities of this research station have contributed to the success of the Carnarvon plantations particularly in the fields of plant selection and pest control. More recently, emphasis has been placed on the introduction of new varieties of avocados, pineapples, mangoes, bananas and citrus fruit, as well as new vegetable varieties and techniques for improving irrigation.

Ord River. The Ord River in the Kimberley Division traverses a tropical area which receives monsoonal rains of irregular incidence and quantity, varying from an annual mean of 510 millimetres in the south to 760 millimetres in the north. Investigations at the Kimberley Research Station, established in 1945 showed that the climate and soil conditions were favourable for the cultivation of a wide range of crops. Following these investigations the State Government, with Commonwealth Government financial assistance, embarked on a project to provide water supplies for irrigation in the area.

The Ord Irrigation Project provides for the development of 72,000 hectares of clay soils and additional areas of sandy soils adjoining the clays. The project comprises four stages: the first was the construction of a diversion dam to supply water for an area of 12,100 hectares and the second, the building of a main storage dam with a capacity of 5,720 million cubic metres. The other stages are the progressive development of the whole 72,000 hectares and the construction of a hydro-electric power station.

The Kununurra Diversion Dam, situated at Bandicoot Bar about 105 kilometres by road south-east of Wyndham and forty-eight kilometres downstream from where the Ord River Dam now stands, was officially opened on 20 July 1963. The capacity of the diversion dam is 97.4 million cubic metres and irrigation from the dam commenced in April 1963. Its storage is named Lake Kununurra.

The Ord River Dam was constructed over three dry seasons, 1969 to 1971 and was officially opened on 30 June 1972. A pump station and irrigation supply facilities to bring 2,020 hectares of new irrigation farmland into production on Packsaddle Plain was completed in December 1973. An extension of the scheme covering 770 hectares on Ivanhoe Plain was completed in 1974. Construction of the hydro-electric scheme is now under consideration.

There are thirty-five farms developed, thirty in the first stage on Ivanhoe Plain averaging 270 hectares each and five in the second stage on Packsaddle Plain averaging 373 hectares each. Prior to 1975 cotton was the main crop. However, owing to high off-farm costs, high costs of insecticides and a decrease in the return for cotton, no crop has been planted since 1974. Maize, soybeans, sorghum, rice, mung beans, peanuts, wheat, pearl millet, bananas and cucurbits are all being grown commercially on the Ord, as well as irrigated pastures and hay crops. Most crops rely on limited local markets such as Perth. Backfreighting by road provides transport at reasonable rates.

In recent years, a double cropping system based on soybeans, mung beans or rice in the wet season and maize, sorghum, sunflowers or rice in the dry season has been developed. This rotation of legume and grass species has minimised insect problems. Biological control, based on the introduction of parasites of the most common insect pests, has resulted in a very much reduced level of insecticide application particularly against pod sucking insects affecting wet season crops.

Soybeans are grown for the Northern Territory and Western Australian feed market. Sunflowers are used for oil extraction. Rice is grown and milled at Kununurra and sold within Western Australia. Peanuts are successfully grown commercially on areas of lighter sandy soil using supplementary sprinkler irrigation.

High production costs due to isolation, have stimulated research into the development of high value crops such as sesame, sugar and other horticultural products. Out of season vegetables and fruits such as cucurbits, bananas and mangoes are grown and marketed in southern Australia.

A rice mill with a capacity of two tonnes per hour and a peanut mill operate at Kununurra.

Sugar is considered to be the crop with greatest potential on the Ord. Over the last four years, the yields from a commercial sized farm of eighty hectares have been at least as good as the best in Queensland. A number of international and Australian companies have now put proposals to the Western Australian government for the building and operation of a mill, developing new land, providing port and transport needs for a sugar industry based on an output of around 160,000 tonnes of sugar per year or its equivalent as ethanol. The earliest this industry could start producing sugar is mid-1985, but the likely date for commencement of production is mid-1986.

The diversion dam was recognised by the Commonwealth Government in August 1959 as an approved project within the meaning of the *Western Australia Grant (Northern Development) Act* 1958 (Commonwealth). This legislation provided for payment by the Commonwealth Government to the State Government of a non-repayable grant of \$10 million for development of the part of the State north of 20°S latitude. Of this grant \$8.2 million was spent on the diversion dam. In February 1963 a further approach was made to the Commonwealth Government requesting an amount of \$3.3 million for the completion of channels and drains required to develop the whole of the 12,100 hectares included in the first stage of the project. The request was approved in August 1963 and moneys made available by way of grant in terms of the *Western Australia (Northern Development) Agreement Act* 1963.

In November 1967, the Commonwealth Government approved the plan for the second phase of the Ord River Irrigation Scheme and agreed to provide financial assistance to the State for the works involved. Agreement as to the terms and conditions for financing the second phase of the scheme was announced in March 1968. In terms of the *Western Australia Agreement (Ord River Irrigation) Act* 1968 the Commonwealth Government agreed to provide financial assistance to the State in an amount equivalent to expenditure on the works, up to a maximum of \$48.18 million. The assistance took the form of a non-repayable grant for the construction of the main Ord dam (\$21.80 million) and an interest-bearing loan for the associated irrigation and drainage facilities.

Fitzroy River. The Camballin irrigation area is situated on the Liveringa flood plain, 105 kilometres south-east of Derby. Irrigation water from the Fitzroy River is diverted by means of a weir with a capacity of 4.7 million cubic metres into Uralla Creek, an anabranch, for twenty-seven kilometres to another dam with a storage of 5.5 million cubic metres constructed on Uralla Creek.

Some 100,000 hectares of irrigable black soil plain are available in the Fitzroy basin. Water to irrigate this area could be provided by building up to four dams on the Fitzroy and its tributaries. No commercial crops are at present being grown at Camballin.

WATER RESOURCES INVESTIGATION AND MEASUREMENT

Work on the investigation and measurement of the water resources of Western Australia, both surface and underground, has continued in recent years with the support of the Australian Water Resources Council, which was established by joint action of the Commonwealth Government

and State Government in 1962. The Council comprises Commonwealth Government and State Government Ministers primarily responsible for water resources.

The primary objective of the Council is the provision of a comprehensive assessment on a continuing basis of Australia's water resources, and the extension of measurement and research so as to provide a sound basis for the planning of future development.

In terms of its main objective, the Council in 1964 recommended, and the Commonwealth Government and State Governments agreed, that there should be an accelerated programme of establishment of stream gauging stations and investigation of groundwater. Financial assistance to the States was rendered by the Commonwealth Government under the *States Grants (Water Resources) Act 1964*, subject to certain qualifying expenditure by each State. Under various States Grants (Waters Resources Measurement) Acts and the *States Grants (Water Resources Assessment) Act 1976*, financial assistance to the States was continued to 30 June 1979. Since then financial assistance has been provided through the *National Water Resources (Financial Assistance) Act 1978*.

Surface Water

To enable the surface water resources of Western Australia to be managed efficiently a network of gauging stations has been set up to monitor the quantity and quality of stream flows throughout the State. A wide range of stream and catchment sizes in a variety of landscapes, environments and climates is being measured. An increasing amount of research is also being carried out to determine the effects of changing land-use practices on the salinity of water in dams and streams.

The number of stream-gauging stations in operation increased each year until 30 June 1979 when the number totalled 303. Because of financial constraints operations in the Timor Sea Division were suspended for the water year October 1980 to September 1981. A limited network has now been re-established in this Division. The network is kept under continual review, with stations being closed when they are no longer required. All stations are under the control of the Public Works Department.

The distribution of operational gauging stations in the various drainage divisions at December 1981 is as follows:

South-West Coast Division (Esperance to the Hill River)	210
Indian Ocean Division (Arrowsmith River to the De Grey River)	40
Timor Sea Division (Broome to the Ord River)	25
Total	<hr/> 275 <hr/>

Groundwater

To locate and measure the quantity and quality of groundwater available to supply the ever-growing needs of town water supplies, industries, farmers, pastoralists, etc. a considerable amount of investigation, including drilling, is in progress in Western Australia. The work is being carried out by the Department of Mines, the Public Works Department, and the Metropolitan Water Supply, Sewerage, and Drainage Board, with the Department of Mines assuming the major responsibility for hydro-geological work.

Groundwater exploration projects in course during 1981 included major investigations of aquifers beneath the Swan Coastal Plain, some of which may provide water to augment Perth's water supply. A network of artesian monitoring bores is being established to study the deeper aquifers under the metropolitan area. Other investigations designed to locate groundwater to provide or augment the water supplies for country towns and new mining developments are continuing.

SEWERAGE SCHEMES

Metropolitan Sewerage

There are ten sewerage systems administered by the Metropolitan Water Supply, Sewerage, and Drainage Board within the metropolitan area.

Wastewater from the major systems either gravitates or is pumped through the pipe systems to treatment plants at Point Peron, Subiaco, Swanbourne, Woodman Point and Beenyup. After treatment the effluent is discharged into the Indian Ocean, some distance from the coast under a substantial depth of water.

The other five systems are served by treatment plants at Canning Vale, Westfield, Kwinana, Kelmscott and Forrestfield, the treated effluent being disposed of in sandy soil in the vicinity of the plant sites.

In addition, the Board is operating temporary, extended aeration plants at Two Rocks, Wanneroo and Yanchep and is also operating extended aeration package plants on behalf of Westrail at Kewdale and the Kalamunda Hospital Board.

METROPOLITAN SEWERAGE SYSTEMS

At 30 June —	Services (a)	Length of sewers
	number	kilometres
1976	120,000	2.886
1977	128,000	3.151
1978	138,000	3.345
1979	148,000	3.555
1980	220,020	3.749
1981	232,986	3.868

(a) Only residential services shown prior to 1980. All services shown from 30 June 1980.

Country Towns Sewerage

At 30 June 1981 forty-five towns outside the metropolitan area had sewerage schemes which were constructed pursuant to the *Country Towns Sewerage Act 1948-1981*. In addition, a further sixteen schemes have been provided by local government authorities under provisions of the Health Act, and ten as private development in mining areas by mining companies. Several other local government authorities have reached an advanced stage of planning to commence schemes in future years.

The following table shows the number of towns sewered, the area sewered and the number of services controlled by the Public Works Department at 30 June for each of the years 1976 to 1981. Details of the individual towns serviced are given in the succeeding table.

COUNTRY SEWERAGE SYSTEMS

At 30 June —	Number of towns sewered	Area sewered	Length of sewers	Services
	number	hectares	kilometres	number
1976	33	4,348	522	15,431
1977	36	4,781	565	17,723
1978	37	5,273	619	19,105
1979	41	5,521	657	20,886
1980	44	6,313	748	23,353
1981	45	6,821	815	25,586

COUNTRY SEWERAGE SYSTEMS: AREA SEWERED, SEWERS AND NUMBER OF SERVICES

Town	At 30 June 1980			At 30 June 1981		
	Area sewered	Length of sewers	Services	Area sewered	Length of sewers	Services
	hectares	kilometres	number	hectares	kilometres	number
Albany	769	106.9	3,398	797	111.0	3,536
Brunswick Junction	—	—	—	6	1.1	—
Bunbury	498	61.8	2,204	557	69.3	2,513
Busselton	30	2.8	12	58	6.8	30
Collie	306	41.7	1,474	381	52.3	1,514
Corrigin	76	10.4	269	76	10.4	280
Cunderdin	34	7.2	140	34	7.2	144
Denmark	8	1.6	30	18	2.4	30
Derby	7	0.9	93	58	6.0	135
Eaton	20	3.9	12	20	3.9	31
Eneabba	34	2.4	58	34	2.4	59
Esperance	22	2.4	51	31	3.9	72
Exmouth	82	10.8	568	83	11.2	569
Geraldton	84	10.1	199	95	12.1	213
Gnowangerup	78	8.2	237	87	9.3	261
Halls Creek	31	2.4	66	31	2.4	73
Harvey	149	15.6	297	172	17.5	393
Karratha	396	36.4	1,447	452	42.9	1,656
Katanning	288	34.2	923	298	35.1	983
Kellerberrin	108	10.4	167	108	10.4	177
Kojonup	93	9.4	227	96	9.9	238
Kununurra	111	10.3	373	113	11.3	397
Laverton	46	5.5	236	46	5.5	238
Leeman	12	1.9	58	12	1.9	61
Mandurah	445	53.1	911	512	63.6	1,288
Manjimup	88	8.9	90	90	9.1	101
Meckering	25	2.5	42	25	2.5	42
Merredin	194	23.5	676	197	23.9	716
Mount Barker	72	9.5	108	72	9.5	120
Mukinbudin	44	3.2	93	44	3.2	112
Narembeen	57	4.8	139	57	4.8	142
Narrogin	299	35.7	1,263	315	38.0	1,528
Northam	448	61.2	2,450	452	61.5	2,593
Pingelly	77	8.1	120	77	8.1	158
Pinjarra	164	17.1	573	168	17.5	585
Port Hedland	73	11.0	516	78	12.0	518
South Hedland	435	37.3	1,725	445	38.5	1,846
Roebourne	54	6.0	157	54	6.0	171
Three Springs	53	4.2	200	54	4.3	210
Wagin	91	12.3	390	103	13.9	408
Wickham	120	19.8	546	122	20.4	577
Wongan Hills	82	9.4	227	82	9.4	244
Wundowie	41	7.1	243	41	7.1	243
Wyalkatchem	48	7.4	162	48	7.4	164
Wyndham	121	8.5	183	122	8.7	217
Total	6,313	748.0	23,353	6,821	815.4	25,586



PLATE 1 — Aerial view of Mount Henry Bridge, a link in the Southern Extension of the Kwinana Freeway.

Main Roads Department



PLATE 2 — Mount Henry Bridge, 660 metres in length is the longest road bridge in Western Australia.

Main Roads Department

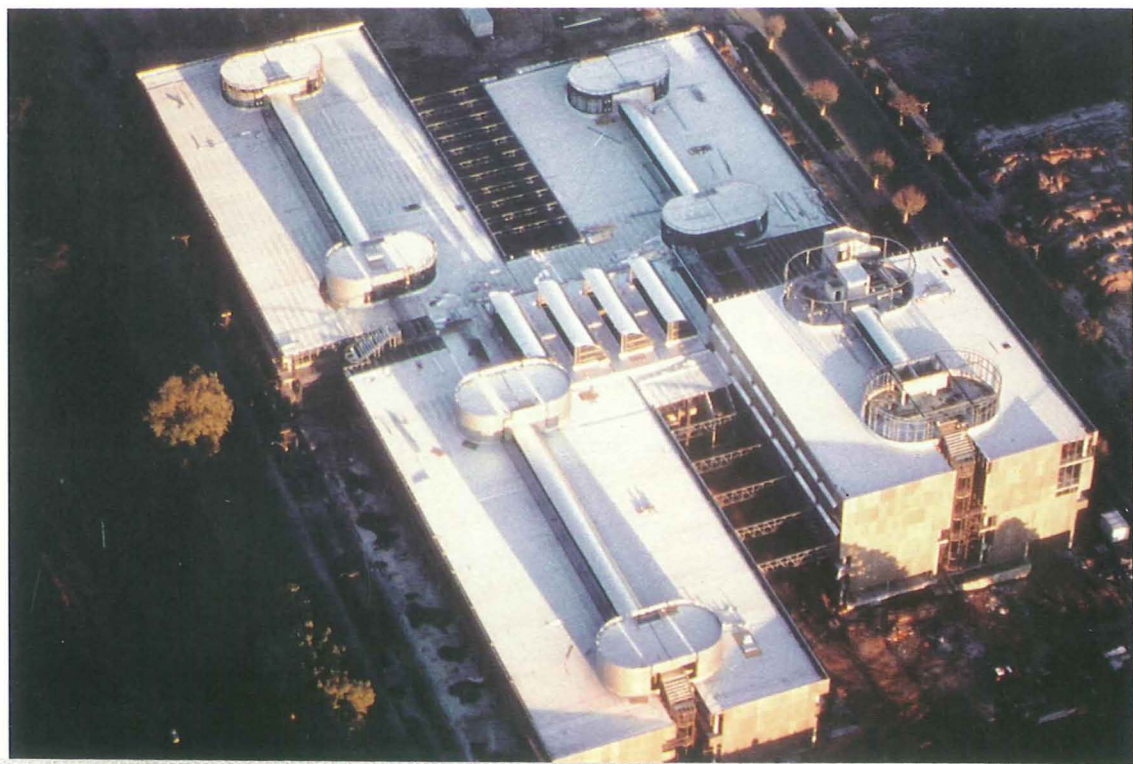


PLATE 3 — Main entrance of the new Education Department Head Office officially opened on 10 June 1982.

Roger Garwood

PLATE 4 — Aerial view of the partly completed Education Department building.

Roger Garwood



Chapter VII—continued

Part 3 — Housing and Construction

AN HISTORICAL REVIEW

Contributed by J. G. White, A. ARCH, P.T.C., F.R.A.I.A.

(Senior Lecturer in Architecture, University of Western Australia)

The first European buildings in Western Australia were built at King George Sound in 1827 but the first considerable spread of buildings began on the Swan River in 1829, following the arrival of free settlers in that area under Captain James Stirling. The difficult first twenty years of settlement produced at best a simple architecture which was a conservative adaptation of the British Georgian tradition, but for many settlers anxious to establish immediate shelter, the best example they could follow was that shown by their own labourers who helped them construct simple cottages using only the raw materials of their new country. Perth, Fremantle, Guildford, York, Bunbury, Augusta and Albany were the only established town-sites to achieve any identity as towns during that period, but it was Perth and Fremantle which made the most rapid progress. Lack of capital and resources during the early years did not deter the government from constructing permanent buildings for its own use, two of which, the gaol at Fremantle, now known as the Round House (1831) and the first court-house at Perth (1837), have survived. Only a handful of other buildings, mostly houses, have survived from this period.

The problems of survival encountered by the earliest settlers were partly met in 1850 when the transportation of convicts was introduced to Western Australia, after it had ceased in the eastern colonies. Captain E. Y. W. Henderson, the commandant of the convict establishment at Fremantle, and several of his officers, all of whom were Royal Engineers with building experience, were responsible for the large buildings at Fremantle which dominated the town until the end of the century. The convict gaol, warders' houses, commissariat store, asylum and other smaller buildings were completed by 1865, and most can still be seen. The Royal Engineers, and public works officers, separately or in association, constructed works and buildings throughout the settled portion of the State. From this period the present Government House (1863) which was built to replace an earlier building completed in 1835, the old Perth Town Hall, the Cloisters, and several churches and schools are among those buildings which have survived. During the years of slow but steady development which paralleled the activities arising out of transportation, Perth and Fremantle grew at a disproportionate rate in relation to the rest of the colony. Improvement in the quality of building was reflected in all towns, but nowhere more so than in Perth, which developed a characteristic style of patterned-brick architecture, and Fremantle, which had grown into a neat, small town of narrow building lots surrounded by stone walls with a stone architecture built from the coastal limestone plentiful in the area.

Expansion until the gold-boom years of the 1890s was essentially agricultural and pastoral with small, widely spaced rural centres. The prosperity which had quickly come to the eastern colonies proved elusive in Western Australia and its lack is reflected in the buildings of the seventies and eighties. When the gold-boom began, Perth and Fremantle were almost residential in appearance with little more than their church spires and town halls, and at Perth a sprinkling of small public buildings, to distinguish them from the smaller country towns, which had increased in number as the boundaries of settlement extended.

The situation changed dramatically in the 1890s when the progressive gold-rushes east of Perth produced rapid increases in population and capital and a sudden demand for buildings of all types. The goldfields towns are entirely the outcome of this period, but all towns in the State show signs of the sudden growth which followed, in their hotels, banks, railway stations, public buildings, and houses. The lack of a large market for building materials, which had denied to Western Australia many of the benefits of nineteenth century technology, ended and by 1900 the construction industry had assimilated new building techniques such as steel and concrete frames, electric lifts, supply of gas, water and electricity, sewage disposal, and the elaborate and costly degree of finish which affluence made possible. Domestic architecture also reflected the change of taste, brought by affluence, experienced many years before in the eastern States, and industries were quickly established to supply the decorative cast-iron work, plaster moulds, pressed metal panels and turned wood-work which had hitherto been imported only by those few who could afford them.

The war of 1914-18 caused a partial cessation of building activities, but building picked up in the early 1920s to complete what had been begun in the two decades from 1895. By 1929 the centre of Perth had been substantially rebuilt and the amalgamation of Perth and Fremantle into one large metropolitan region was well under way.

The depression years of 1930 to 1932 once more brought the building industry almost to a standstill, but by 1939, at the outbreak of war, building was again proceeding strongly. The Commonwealth Bank in Murray Street, built during the depression with public funds, was the last grand expression of an architectural tradition going back to ancient Rome. The architecture of the post-depression years was more austere than that which preceded it, foreshadowing the complete change that was to take place following the end of the 1939-45 war.

The recommencement of building after the war was strictly controlled by the State Government which imposed limitations upon the cost and size of houses for which there was a great demand. Flat-building, which had been very limited before 1939, began to expand, at first slowly, but more rapidly in the 1960s when it became closely linked with investment. The State Housing Commission departed from the cherished ideal of home ownership to build Wandana Flats in Subiaco in 1956, and uniform regulations to control flat-building were introduced in 1966. In the private sector of housing, the large-scale project home builders have grown in strength, and many of them have tended to combine subdivision and building into large tract developments, several of which have assumed the form of regional centres within the metropolitan region and on the periphery of the larger country towns. A belief in the advantages of individual home ownership which was established in 1829, has continued to form the basis of planning despite the erosion caused by an increasing proportion of flats and home-units in all parts of the State.

The change in architectural style which began in the early post-war years influenced the appearance of all subsequent buildings. Although nostalgia remains for the decorated buildings of the years before 1939, the building industry has lost its capacity to construct them, and is geared to the technical demands of modern construction methods which can be seen at their best in the centre of Perth. Almost all of the commercial buildings completed up to 1939 in St George's Terrace have been replaced by high-rise steel, concrete and glass office towers with air-conditioning and well-lit interiors. As they grow in height, so does the centre of the metropolitan region become correspondingly more apparent.

HOUSING AND THE CENSUS

The definitions given below are relevant when considering data derived from the Census of Population and Housing.

Occupied Dwelling. For the purpose of the Census of Population and Housing an occupied dwelling is any habitation occupied on census night by a household group living together as a

domestic unit, and may comprise the whole of a building or only part of it. The term has therefore a very wide reference and includes, in addition to houses and flats, a great variety of dwellings ranging from a single-roomed shack to a multi-roomed hotel or institution.

Unoccupied Private Dwelling. An unoccupied private dwelling is defined as a structure built specifically for private living purposes and capable of being lived in, though unoccupied at the time of the census. The term includes vacant dwellings available for sale or renting; dwellings such as week-enders or holiday homes which were not occupied on census night; dwellings normally occupied but whose occupants were temporarily absent on the night of the census; newly-completed dwellings whose owners or tenants had not entered into occupation on census night; and dwellings described as 'to be demolished', 'condemned', 'exhibition home', etc. The total number of unoccupied dwellings does not, therefore, represent the number of vacant houses and flats available for sale or renting.

Private Dwellings comprise the following classes:

Private House, which includes separate houses; semi-detached houses; attached houses; terrace houses; and villa units.

Self-contained Flat. A self-contained flat is part of a house or other building which can be completely closed off and which has its own cooking and bathing facilities. Home units are included in this class.

Other Flat is part of a house, flat or other premises which is not self-contained.

Other Private Dwellings include sheds, tents, garages, caravans, houseboats, etc. occupied on a permanent or semi-permanent basis.

Dwellings at Censuses from 1901

The number of unoccupied dwellings shown for censuses prior to 1971 include both private and non-private dwellings, while those for the 1971 and subsequent censuses refer to private dwellings only.

DWELLINGS — CENSUSES, 1901 TO 1981 (a)

Census date	Occupied dwellings			Unoccupied dwellings	
	Private		Non-private		
	Number	Average number of inmates			
1901 — 31 March	(b) 46,436	(c) 3.35	2,070	48,506	2,263
1911 — 3 April	(d) 66,553	(e) 3.68	2,317	68,870	3,158
1921 — 4 April	70,185	4.11	3,363	73,548	3,274
1933 — 30 June	100,441	3.95	3,137	103,578	4,029
1947 — 30 June	122,078	3.73	2,689	124,767	2,606
1954 — 30 June	159,496	3.64	3,327	162,823	6,614
1961 — 30 June	191,616	3.59	2,701	194,317	13,705
1966 — 30 June	222,416	3.53	3,285	225,701	17,965
1971 — 30 June	284,359	3.38	2,486	286,845	(f) 28,274
1976 — 30 June	336,768	3.18	2,337	339,105	(f) 34,064
1981 — 30 June	403,600	2.99	2,397	405,997	(f) 42,100

(a) Figures for censuses prior to 1966 exclude dwellings occupied solely by full-blood Aborigines; those for 1966 and later relate to all dwellings. (b) Comprises 17,702 dwellings of calico, canvas, and hessian, with an average of 2.10 inmates, and 28,734 other dwellings with an average of 4.12 inmates. (c) See note (b). (d) Comprises 14,216 dwellings of calico, canvas, and hessian, with an average of 1.93 inmates, and 52,337 other dwellings with an average of 4.16 inmates. (e) See note (d). (f) Unoccupied private dwellings only.

The following table gives particulars of the numbers of occupied dwellings at the Censuses of 1976 and 1981, together with the total numbers of persons enumerated.

Between the Censuses of 1976 and 1981, the number of occupied dwellings in the State increased by 19.7 per cent. The number of persons enumerated in private dwellings showed an increase of 12.7 per cent.

OCCUPIED DWELLINGS AND PERSONS ENUMERATED CENSUSES, 1976 AND 1981

Particulars	Census, 30 June —					
	1976			1981		
	Number	Per cent of total	Number	Per cent of total	Increase since 1976	
					Number	Per cent
Occupied dwellings —	'000		'000		'000	
Private	336.8	99.3	403.6	99.4	66.8	19.8
Non-private	2.3	0.7	2.4	0.6	0.1	2.6
Total, Occupied dwellings	339.1	100.0	406.0	100.0	66.9	19.7
Persons enumerated in —						
Private dwellings	1,070.1	93.5	1,205.8	94.7	135.7	12.7
Non-private dwellings	71.5	6.2	65.1	5.1	—6.4	—9.0
Migratory population (a)	3.2	0.3	2.7	0.2	—0.5	—15.6
Total population	1,144.9	100.0	1,273.6	100.0	128.8	11.2

(a) Comprises persons (both passengers and crew) who, at midnight on census night, were enumerated on board ships in Western Australian ports, or ships which had left an Australian port before census night for a next port of call in Western Australia. It includes also those who were enumerated on long-distance trains, motor coaches or aircraft. Also includes campers-out.

Occupied Private Dwellings

Number of Rooms. The following table shows details of the number of rooms in occupied private dwellings at the Census of 30 June 1981.

OCCUPIED PRIVATE DWELLINGS NUMBER OF ROOMS (a): CENSUS, 30 JUNE 1981

Number of rooms (a)	Separate house			Other (b)		
	Perth Statistical Division	Rest of State	Total	Perth Statistical Division	Rest of State	Total
1	93	177	270	758	677	1,435
2	283	560	843	3,542	976	4,518
3	1,767	1,851	3,618	11,972	2,103	14,075
4	20,134	10,815	30,949	25,915	4,263	30,178
5	62,352	30,683	93,035	13,580	2,758	16,338
6	64,717	24,036	88,753	5,272	956	6,228
7	44,632	12,689	57,321	1,310	322	1,632
8 or more	37,964	9,591	47,555	777	332	1,109
Not stated	1,394	795	2,189	1,671	1,883	3,554
Total	233,336	91,197	324,533	64,797	14,270	79,067

(a) Includes kitchen, bathroom and permanently enclosed sleep-out, but does not include toilet, pantry, laundry, storeroom, hall or corridor. (b) Includes flat, home unit, mobile home (not in caravan park), improvised dwelling and private boarding house.

Number of Bedrooms. The next table shows details of the number of bedrooms in occupied private dwellings at the Census of 30 June 1981.

OCCUPIED PRIVATE DWELLINGS NUMBER OF BEDROOMS (a): CENSUS, 30 JUNE 1981

Number of bedrooms (a)	Separate house			Other (b)		
	Perth Statistical Division	Rest of State	Total	Perth Statistical Division	Rest of State	Total
None (c)	14	23	37	65	19	84
1	3,480	2,299	5,779	15,970	3,261	19,231
2	44,318	17,673	61,991	31,821	5,466	37,287
3	134,296	52,919	187,215	14,335	3,032	17,367
4	45,015	15,227	60,242	820	429	1,249
5	4,239	1,818	6,057	100	70	170
6 or more	674	486	1,160	59	121	180
Not stated	1,300	752	2,052	1,627	1,872	3,499
Total	233,336	91,197	324,533	64,797	14,270	79,067

(a) Includes permanently enclosed sleep-out. (b) Includes flat, home unit, mobile home (not in caravan park), improvised dwelling and private boarding house. (c) Includes one-room flat and bed-sitting room.

Unoccupied Private Dwellings

For dwellings not occupied on the night of the census, collectors were required to determine as many particulars as possible and, where the information was available, to enter on the census schedule the reason why the dwelling was unoccupied. The following table shows details of unoccupied private dwellings at the Census of 30 June 1981.

UNOCCUPIED PRIVATE DWELLINGS — CENSUS, 30 JUNE 1981

Reason for being unoccupied	Perth Statistical Division	Rest of State	Total
For sale	2,269	787	3,056
To let, not holiday home	4,547	2,122	6,669
New, awaiting occupancy	1,235	624	1,859
Vacant for repair etc.	1,012	723	1,735
Holiday home	2,369	6,610	8,979
Condemned for demolition	466	348	814
Resident temporarily absent	9,520	5,348	14,868
Other, n.e.i.	1,787	2,333	4,120
Total	23,205	18,895	42,100

Geographical Distribution of Dwellings

Statistical Divisions. The following table shows the numbers of occupied and unoccupied dwellings in each statistical division of Western Australia at the Censuses of 1976 and 1981.

The former grouping of municipal districts on the basis of climatological and geographical characteristics was revised with effect from 1 January 1976 to take into account also social and economic criteria. (The statistical divisions and their component local government areas are shown in lists at the end of Chapter III.)

Between the Censuses of 1976 and 1981 the number of dwellings in Western Australia rose by 20.0 per cent. The number in the Perth Statistical Division increased by 20.6 per cent, compared with an increase of 18.5 per cent in the rest of the State. The other divisions showed the following increases: Kimberley, 50.7 per cent; Pilbara, 41.2 per cent; South-West, 24.7 per cent; Central, 19.9 per cent; Lower Great Southern, 16.0 per cent; South-Eastern, 9.0 per cent; Upper Great Southern, 5.2 per cent and Midlands, 4.7 per cent.

DWELLINGS IN STATISTICAL DIVISIONS — CENSUSES, 1976 AND 1981

Statistical division	Census, 30 June 1976 (a)		Census, 30 June 1981			
	Total occupied dwellings	Un-occupied private dwellings	Occupied dwellings			Un-occupied private dwellings
			Private	Non-private	Total	
Perth Statistical Division	249,328	17,744	298,133	810	298,943	23,205
Other divisions —						
South-West	25,163	6,070	31,052	240	31,292	7,642
Lower Great Southern	11,398	1,920	13,057	125	13,182	2,266
Upper Great Southern	6,614	902	6,832	81	6,913	997
Midlands	14,068	3,250	14,603	193	14,796	3,331
South-Eastern	10,872	1,555	11,921	229	12,150	1,401
Central (b)	11,874	1,645	13,847	298	14,145	2,064
Pilbara	7,592	691	10,577	208	10,785	911
Kimberley	2,504	200	3,578	213	3,791	283
Total	90,085	16,233	105,467	1,587	107,054	18,895
WESTERN AUSTRALIA	339,413	33,977	403,600	2,397	405,997	42,100

(a) The 1976 Census figures have been adjusted to provide figures on the basis of the boundaries of local government areas at 30 June 1981. (b) Includes Houtman Abrolhos (unincorporated).

Australian States. The following table gives the numbers of dwellings recorded in each of the Australian States and in Australia as a whole at the Census of 30 June 1981.

DWELLINGS — AUSTRALIAN STATES: CENSUS, 30 JUNE 1981

Type of dwelling	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	Australia (a)
Occupied dwellings —							
Private	1,662,758	1,238,945	698,232	432,136	403,600	135,598	4,668,909
Non-private	6,838	4,122	5,732	1,703	2,397	670	22,123
Total. Occupied dwellings	1,669,596	1,243,067	703,964	433,839	405,997	136,268	4,691,032
Unoccupied private dwellings	153,251	124,522	83,366	42,407	42,100	17,765	469,742
Total dwellings	1,822,847	1,367,589	787,330	476,246	448,097	154,033	5,160,774

(a) Includes Northern Territory (29,049 occupied private dwellings, 512 occupied non-private dwellings and 2,368 unoccupied dwellings) and Australian Capital Territory (68,591 occupied private dwellings, 149 occupied non-private dwellings and 3,963 unoccupied dwellings).

CONSTRUCTION OF BUILDINGS, 1980-81

The value of building work done in Western Australia in 1980-81 was \$930 million at current prices. Notwithstanding minor changes to the scope and methods of compilation of building statistics from 1 July 1980 which resulted in data for 1980-81 not being strictly comparable with earlier years, this represented an increase of 8 per cent over 1979-80. Of the value of all building work done in Australia in 1980-81 (\$10,026 million), Western Australia's share was 9 per cent compared with 11 per cent in 1979-80.

Private sector projects accounted for 86 per cent of building work done in 1980-81. This is the highest proportion recorded in the last ten years, with the lowest being 73 per cent in 1974-75.

Of the value of all building work done in Western Australia in 1980-81 construction of dwellings (including alterations and additions) accounted for 60 per cent, commercial buildings (i.e. offices, shops, factories, hotels and other business premises) 28 per cent and community buildings (i.e. premises for education, health, religious, and entertainment and recreation purposes) 9 per cent. Compared with 1979-80, the value of commercial building increased by 31 per cent, with the main component, office building, increasing by 38 per cent from \$73 million to \$101 million. During the same period work done on buildings for community purposes decreased by 34 per cent with premises for education purposes falling by 16 per cent from \$35 million to \$29 million and those for health by 48 per cent from \$65 million to \$34 million.

From 1979-80 dwelling commencements increased by 14 per cent in value terms to \$542 million in 1980-81. In terms of the number of dwellings commenced however, this represented a decrease of 313 to 15,380. Although the house component declined by 1,094 to 10,210, this was partly offset by an increase of 788 in other dwellings to 5,177. Public sector dwelling commencements declined from 1,319 in 1979-80 to 954 in 1980-81.

In the private house building sector, alterations and additions continued to be a growing element. In 1980 approved alterations and additions to private houses comprised 6,987 jobs valued between \$2,000 and \$9,999 and 1,891 jobs valued at \$10,000 or over, compared with 10,343 new private houses approved for the same period. By comparison in 1976-77 there were 6,906 and 1,061 alterations and additions jobs respectively and 12,533 new private houses approved. The total approval value of these jobs amounted to \$449 million in 1980-81 and \$379 million in 1976-77, with the alterations and additions components representing 14 per cent (\$65 million) and 12 per cent (\$44 million) respectively in the two years.

MAJOR CONSTRUCTION PROJECTS

North West Shelf Project

The North West Shelf project is operated by a Joint Venture comprising a group of Australian and international companies. Its purpose is to exploit natural gas from gasfields located off the north-west coast of Western Australia.

The domestic gas production phase involves the fabrication and installation of the first production platform, North Rankin 'A', the laying of an offshore pipeline, and the construction of the processing and storage facilities for the gas at Withnell Bay on the Burrup Peninsula. In addition, a pipeline will be laid to carry the gas from the processing plant to Perth, with an extension to Wagerup. Gas production is scheduled to commence in 1984.

By the end of June 1982 North Rankin 'A' had been fabricated and placed in position at sea. From here, the gas is to be piped 135 kilometres to the shore under pressure from the reservoir. The pipe laying operation began about twenty-one kilometres from shore and had reached North Rankin 'A' in the last week in September 1982. The inshore section of the line was left until last because blasting and dredging were necessary to excavate a trench along the proposed route. Where it crossed hard rock the bottom of the trench was levelled by the use of explosives.

After the pipeline was laid on the sea bed, a specially designed undersea plough was towed along the pipe, lifting the pipe and replacing it in the ploughed furrow. Following this, 2.3 million tonnes of graded rock were dumped on sections of the pipe for added protection.

The pipeline comes ashore at Withnell Bay on Burrup Peninsula, ten kilometres north of Dampier, where the gas will be processed and stored. Site preparation work for the plant was completed in December 1982.

In terms of scale and complexity the North West Shelf Project will be one of the largest energy resource projects undertaken in the world during the 1980s. It is expected to cost approximately \$11,000 million to bring it to its plateau rate of production.

CONTROL OF BUILDING

Each of the local government authorities as constituted under the provisions of the *Local Government Act 1960-1982* has power to exercise general control over the erection of buildings in its own district. The powers of local government authorities to control building derive from the Town Planning and Development Act and the Local Government Act.

The *Town Planning and Development Act 1928-1980* gives local authorities the right to make town planning schemes and town planning by-laws covering such aspects as the purchase or reservation of land for thoroughfares, the density of dwelling accommodation per hectare, the classification of areas for residential, commercial, industrial and recreational use, the prescription of building standards, and the general planning of new subdivisions. Town planning schemes proposed by a local authority are subject to the approval of the Minister for Town Planning, who has the advice of the Town Planning Board.

The *Local Government Act 1960-1982* contains provisions, for the control of building, which are compatible with those exercised under the Town Planning and Development Act but are in a more detailed form. The Uniform Building By-laws have been applied to most local government areas, and the erection of all buildings must be carried out in compliance with these by-laws. The Local Government Act provides that no new building or the alteration of an existing building may be begun before the plans have been approved by the local authority. The Governor may by Order, at the request of a local authority, suspend the operation of this provision in its district. Generally, in remote parts of the State prior approval of plans is required only in the case of building in townsite areas. Where any local authority refuses to approve plans, the Act provides that an appeal may be made to the Minister for Local Government, who has the power to modify or reverse the decision of the local authority. The decision of the Minister is final and not subject to appeal. Other appeals or matters in dispute in relation to the control of building may be determined only by two referees, one of whom is appointed by the Governor and the other by the local authority concerned.

BUILDING STATISTICS

Scope

The statistics in this section relate to the erection of new buildings and alterations and additions valued at \$10,000 or more to existing buildings. Non-building construction of railways, roads, bridges, earthworks, etc. is excluded. Also excluded are particulars of repairs and maintenance to buildings.

From the September quarter 1945, up to and including the June quarter 1980, a quarterly collection of statistics of building operations has been undertaken. This collection comprises the activities of all private contractors and government authorities engaged in building, and owner-builders who erected buildings without the service of a contractor responsible for the whole job.

From the September quarter 1980, a new Building Activity Survey has replaced the Building Operations Census. The main difference is the replacement of the former full enumeration of private sector house jobs (both new and alterations and additions valued at \$10,000 and over) by a sample survey. All other building jobs continue to be completely enumerated.

Although the differences in concept between the new Building Activity Survey and the previous Building Operations Census are minor, figures from the September quarter 1980 are not strictly comparable with those for earlier periods, and caution should be exercised in comparing data across the time span of the change in collection methodology.

Source of Data

Data relating to the building approvals, building commencements and building activity series are based on permits issued by local government authorities together with contracts let or day labour work authorised by Commonwealth, State, semi-government and local government authorities. Also included is building activity undertaken by private organisations in areas not subject to the control of local government authorities. Examples of the latter include buildings on remote mine sites and farm buildings outside town site boundaries.

Definitions

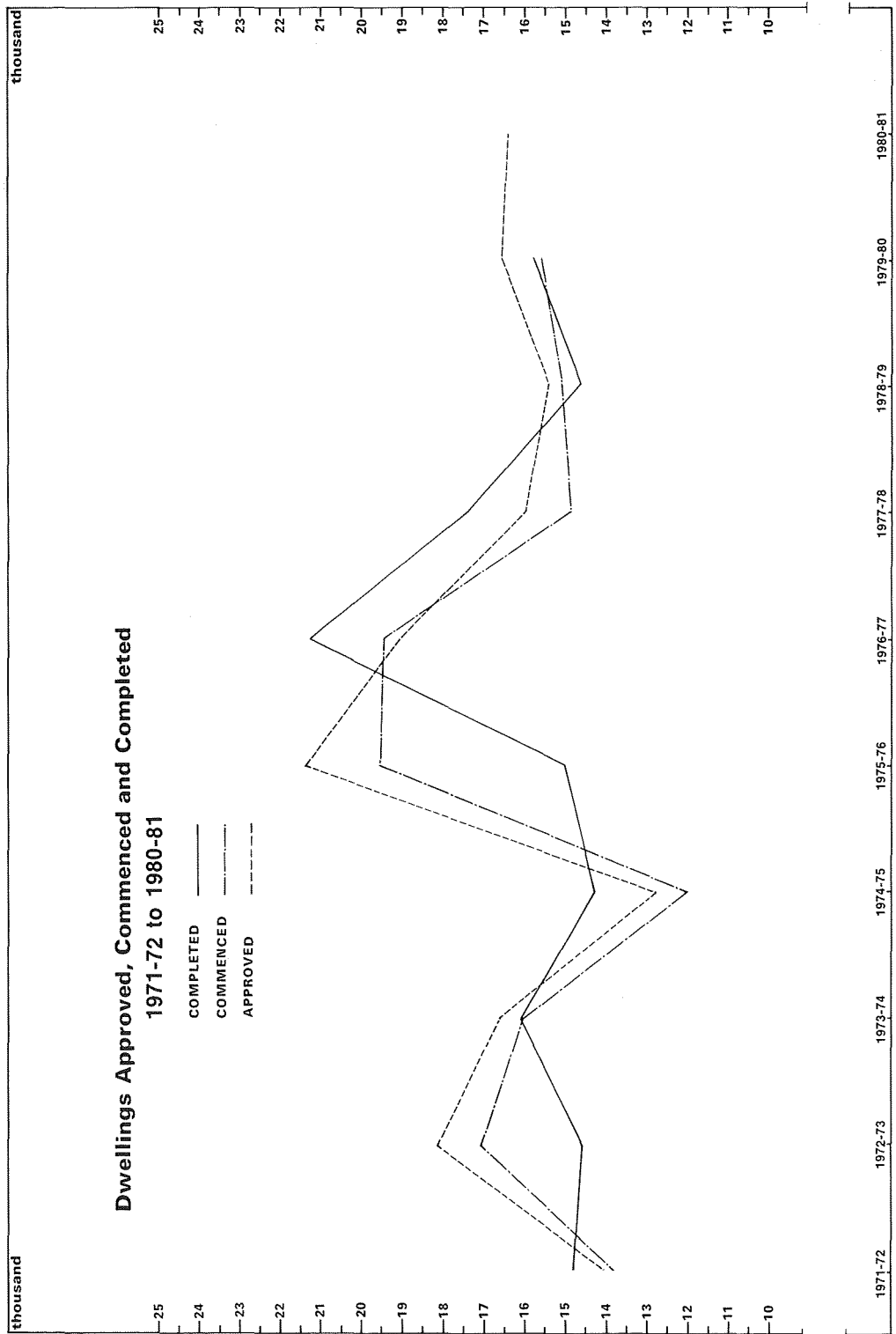
Private sector, public sector. A building is classified as 'private sector' or 'public sector' according to ownership at the time of approval. Buildings erected by day labour or by private contractors for government bodies are classed as public sector operations, even if the building is for sale subsequently. Building carried out by private contractors for private ownership, or which is financed or supervised by government instrumentalities but erected for a specified person, is classed as private sector.

Dwellings. A dwelling is classified as either a 'House' or an 'Other dwelling'.

- (i) A 'House' is a building which has been designed or adapted so that its prime purpose is to be a single self-contained dwelling unit (i.e. including bathing and cooking facilities), which is completely detached from other buildings, and occupies (except in such cases as dwellings built for employees or families of the owner or lessee of the land) a separate titled block of land.
- (ii) An 'Other dwelling' is a self-contained dwelling unit other than a house. This includes flats, home units, semi-detached dwellings, villa units, town houses, etc. Numbers of 'Other dwellings' refer to the number of new individual dwelling units (e.g. one block of flats containing 10 separate flat units would be counted as 10 dwellings).

When a dwelling is attached to a new building, the whole unit, both in regard to number and value, is classified according to the type of new building (e.g. a new shop and dwelling is classified simply as a shop).

Other building. Relates to construction work on buildings other than dwellings. Additions and alterations to 'Other building' are also included.



Commenced. A building is regarded as having been commenced when work on the foundations has begun.

Completed. A building is regarded as having been completed when the building contractor has fulfilled the terms of the contract or, in the case of owner-built houses, when the house is either completed or substantially completed and occupied.

Value of building completed. Represents the estimated value of the whole job when completed, excluding the value of the land. Site preparation costs are included.

Value of building work done. Represents the estimated value of the building work actually carried out during the period.

All values shown are current values, i.e. no adjustment has been made for the substantial rise in building costs over recent years. Some perspective to the increases in values can be gained from the wholesale price indexes of materials used in house building and of materials used in building other than house building for Perth (see Chapter X, Part 3).

Building Approvals

The following table shows details of building approved in Western Australia for the years 1975-76 to 1980-81.

BUILDING APPROVALS

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number						
New dwellings —						
Houses — Private	14,932	12,533	10,933	11,073	11,240	10,343
Government	668	903	969	668	484	548
Other — Private	5,288	5,267	3,528	3,169	4,231	5,052
Government	500	359	552	518	681	438
Total	21,388	19,062	15,982	15,428	16,636	16,381
Value (\$'000)						
New dwellings —						
Houses — Private	333,469	335,444	320,023	329,300	362,008	384,701
Government	14,700	24,659	24,924	21,037	16,816	19,458
Other — Private	82,372	101,220	70,494	64,921	91,350	133,984
Government	7,953	7,786	11,617	11,382	15,494	8,901
Total	438,494	469,109	427,059	426,641	485,668	547,044
Alterations and additions to dwellings (a) —						
Private	10,165	16,191	24,656	31,891	35,411	42,033
Government	—	—	80	463	—	105
Other building —						
Private	78,513	116,960	157,000	185,836	195,942	380,389
Government	104,038	97,727	112,680	78,793	79,755	90,453
All building —						
Private	504,521	569,815	572,174	611,949	684,711	941,108
Government	126,691	130,172	149,301	111,676	112,065	118,916
Total	631,211	699,988	721,475	723,625	796,776	1,060,024

(a) Valued at \$10,000 and over.

Building Activity

The following tables show, for each class of building, the value (when completed) of building work commenced and completed, together with the value of building work done, in the years 1975-76 to 1980-81.

**VALUE OF BUILDING COMMENCED BY CLASS OF BUILDING
(\$m)**

Class of building	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81 (a)
New dwellings —						
Houses	326.4	386.2	338.6	357.0	377.1	392.2
Other dwellings	85.1	111.4	78.3	77.1	100.0	149.4
Total, New dwellings	411.5	497.6	416.9	434.1	477.1	541.6
Alterations and additions (b) to dwellings	8.5	17.1	22.8	32.2	32.0	42.3
Other building —						
Hotels, etc.	5.8	6.3	6.8	3.4	6.9	15.9
Shops	20.6	25.6	46.4	51.0	36.5	46.4
Factories	30.9	27.2	42.0	37.9	31.9	50.7
Offices	11.2	21.0	24.5	53.1	91.3	124.2
Other business premises	17.6	21.4	30.1	28.9	41.6	51.7
Education	30.4	37.0	50.4	45.1	30.2	37.8
Religion	1.2	2.7	3.2	2.1	2.9	2.6
Health	32.7	30.2	18.4	43.0	13.3	28.6
Entertainment and recreation	8.0	8.9	14.4	17.0	24.1	18.2
Miscellaneous	24.1	39.4	56.4	22.1	23.9	51.9
Total, Other building	182.6	219.7	292.6	303.8	302.8	428.0
TOTAL, ALL BUILDING	602.6	734.3	732.2	770.0	811.9	1,011.9

(a) 1980-81 figures are not strictly comparable with those for earlier periods. See preceding text dealing with scope of building statistics. (b) Valued at \$10,000 and over.

**VALUE OF BUILDING COMPLETED BY CLASS OF BUILDING
(\$m)**

Class of building	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81 (a)
New dwellings —						
Houses	253.8	395.0	378.8	349.1	380.9	375.5
Other dwellings	44.0	113.9	98.9	74.9	93.2	108.0
Total, New dwellings	297.7	508.9	477.7	424.0	474.2	483.4
Alterations and additions (b) to dwellings	8.7	15.4	21.5	30.5	33.3	37.5
Other building —						
Hotels, etc.	7.5	6.2	6.0	5.6	4.5	8.1
Shops	17.2	22.5	35.5	50.0	42.3	40.8
Factories	22.4	26.6	34.6	44.0	51.5	37.0
Offices	45.7	43.5	18.2	33.2	49.9	75.0
Other business premises	12.1	31.9	22.9	55.3	31.2	37.2
Education	58.3	29.5	46.1	56.3	33.2	29.6
Religion	1.5	1.5	4.0	3.1	2.4	2.7
Health	26.6	27.6	33.2	29.1	30.1	36.8
Entertainment and recreation	9.4	9.0	8.6	14.0	27.8	20.3
Miscellaneous	26.8	28.1	24.9	48.5	29.1	21.3
Total, Other building	227.3	226.4	234.0	339.3	301.9	308.8
TOTAL, ALL BUILDING	533.8	750.7	733.3	793.8	809.4	829.7

(a) See footnote (a) to previous table. (b) Valued at \$10,000 and over.

**VALUE OF BUILDING WORK DONE BY CLASS OF BUILDING
(\$m)**

Class of building	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81 (a)
New dwellings —						
Houses	286.4	402.3	364.7	349.4	382.0	388.4
Other dwellings	64.8	113.1	92.4	73.8	95.8	123.7
Total, New dwellings	351.2	515.4	457.1	423.2	477.8	512.2

VALUE OF BUILDING WORK DONE BY CLASS OF BUILDING — *continued*
(\$m)

Class of building	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81 (a)
Alterations and additions (b) to dwellings	8.4	16.3	22.6	31.9	32.8	42.3
Other buildings —						
Hotels, etc.	5.6	6.9	6.3	4.2	6.7	10.5
Shops	19.2	23.8	41.6	44.7	48.7	40.8
Factories	23.6	42.3	43.3	43.2	37.1	53.5
Offices	28.7	18.6	22.7	41.2	73.2	101.0
Other business premises	17.3	34.9	31.2	36.7	31.4	52.5
Education	44.6	32.3	47.9	51.4	35.1	29.4
Religion	1.7	1.6	4.1	2.5	2.6	2.5
Health	26.5	32.4	39.3	40.0	64.6	33.9
Entertainment and recreation	9.1	9.2	9.2	17.9	27.1	19.2
Miscellaneous	26.9	24.9	40.7	37.6	22.5	32.1
Total, Other building	203.2	226.9	286.2	319.5	349.0	375.4
TOTAL, ALL BUILDING	562.9	758.6	765.8	774.6	859.6	930.0

(a) See footnote (a) to previous table. (b) Valued at \$10,000 and over.

More detailed statistics relating to building are published quarterly in the bulletin *Building Activity, Western Australia*, (Catalogue No. 8704.5).

Number of Dwellings

The following table shows the number of houses and other dwellings, classified by ownership, commenced in Western Australia for the years 1975-76 to 1980-81. The source of the data is the Building Operations Census for periods up to and including 1979-80, and the Building Activity Survey for information with respect to 1980-81.

NUMBER OF NEW HOUSES AND NEW OTHER DWELLINGS COMMENCED
CLASSIFIED BY OWNERSHIP: 1975-76 TO 1980-81

Year	Private sector		Public sector		Total	
	Houses (a)	Other dwellings	Houses (a)	Other dwellings	Houses (a)	Other dwellings
1975-76	13.802	4.648	660	460	14.462	5.108
1976-77	13.096	4.979	869	495	13.965	5.474
1977-78	10.225	3.091	1,115	470	11.340	3.561
1978-79	10.666	3.229	802	418	11.468	3.647
1979-80	10.663	3.711	641	678	11.304	4.389
1980-81 (b)	9.670	4.759	540	418	10.210	5.177

(a) 1980-81 figures are rounded to nearest ten units. (b) 1980-81 figures are not strictly comparable with those for earlier periods. See preceding text for details.

A consequence of the sampling techniques used for private sector house building in the new Building Activity Survey is that estimates for this class of building cannot be produced at finer levels of geographic disaggregation than State/Territory levels without incurring unacceptably high sampling errors. For the same reason data are unable to be classified by as many variables as was possible previously, so that information regarding materials of outer walls and roof, floor area, etc. are no longer available from this source.

To compensate for this loss of detail, a new monthly Building Commencement series was implemented in July 1980. The data are compiled from monthly returns supplied by local and other government authorities. However, because this methodology is different from that of the Building Activity Survey, total figures for Western Australia differ between the two series by a small margin.

The following table shows the number of new houses and new other dwellings commenced in each statistical division during 1980-81.

NEW DWELLINGS COMMENCED IN STATISTICAL DIVISIONS BY OWNERSHIP: 1980-81

Statistical division	Private sector			Public sector			Total		
	Houses	Other dwellings	Total	Houses	Other dwellings	Total	Houses	Other dwellings	Total
Perth Statistical Division	6,444	3,817	10,261	187	272	459	6,631	4,089	10,720
Other divisions —									
South-West	1,619	395	2,014	60	68	128	1,679	463	2,142
Lower Great Southern	269	30	299	27	10	37	296	40	336
Upper Great Southern	62	—	62	16	—	16	78	—	78
Midlands	261	12	273	19	20	39	280	32	312
South-Eastern	186	50	236	26	10	36	212	60	272
Central	275	44	319	38	30	68	313	74	387
Pilbara	317	167	484	117	57	174	434	224	658
Kimberley	122	24	146	22	12	34	144	36	180
Total	3,111	722	3,833	325	207	532	3,436	929	4,365
WESTERN AUSTRALIA	9,555	4,539	14,094	512	479	991	10,067	5,018	15,085

The next table shows the number of new houses, classified by material of outer walls, commenced in Western Australia for the years 1975-76 to 1980-81. The figures for 1980-81 were obtained from the new Building Commencement series, while those for previous years were obtained from the Building Operations Census.

NUMBER OF NEW HOUSES COMMENCED, BY MATERIAL OF OUTER WALLS
1975-76 TO 1980-81

Year	Double brick (a)	Brick veneer	Fibre cement	Other	Total, new houses
1975-76	11,839	1,336	1,180	107	14,462
1976-77	10,647	1,776	1,291	251	13,965
1977-78	8,486	1,576	1,018	260	11,340
1978-79	9,076	1,447	778	167	11,468
1979-80	9,135	1,340	674	155	11,304
1980-81 (b)	8,041	1,168	712	146	10,067

(a) Includes houses built with outer walls of stone or concrete.

(b) 1980-81 figures are not strictly comparable with those for earlier periods. See preceding text for details.

For more detailed monthly housing commencement statistics see the publication, *Number of New Dwellings Commenced in Western Australia* (Catalogue No. 8709.5).

NEW HOUSES AND NEW OTHER DWELLINGS COMPLETED
AUSTRALIAN STATES AND TERRITORIES: 1980-81

	New houses (b)	New other dwellings (a)	Total new dwellings (a)		
			Total number completed (b)	Proportion of Australian total (per cent)	Per thousand of mean population
New South Wales	36,200	13,793	50,000	36.8	9.6
Victoria	21,480	4,423	25,900	19.1	6.6
Queensland	22,170	7,789	29,960	22.0	13.2
South Australia	6,370	1,660	8,030	5.9	6.2
Western Australia	10,120	4,531	14,650	10.8	11.5
Tasmania	2,510	993	3,500	2.6	8.2
Northern Territory	1,310	564	1,880	1.4	15.0
Australian Capital Territory	1,300	672	1,970	1.4	8.6
AUSTRALIA	101,450	34,425	135,880	100.0	9.2

(a) Individual dwelling units.

(b) Rounded to nearest ten units.

The previous table shows the number of new houses and new other dwellings completed in each of the Australian States and Territories during the year 1980-81. In Western Australia the number of new dwellings completed per thousand of mean population was 11.5 compared with 9.0 in the rest of Australia and 9.2 in Australia as a whole. The total number of new dwellings completed in Western Australia per thousand of mean population decreased from 1979-80 when the figures were 12.6 for the State, 8.6 in the rest of Australia and 8.9 in Australia as a whole.

HOUSING FINANCE

The following table shows details of loans approved to individuals for the construction or purchase of dwellings for occupation by the owners. The sources of the loans include, *inter alia*, banks, permanent and terminating building societies, finance companies and Government agencies.

LOANS APPROVED TO INDIVIDUALS FOR CONSTRUCTION OR PURCHASE OF OWNER OCCUPIED DWELLINGS

Year	Loans approved for:							
	Construction of new dwellings		Purchase of newly built dwellings		Purchase of established dwellings		Total	
	Dwelling units	\$m	Dwelling units	\$m	Dwelling units	\$m	Dwelling units	\$m
1976-77	9,051	186.1	3,259	66.5	16,068	313.5	28,378	566.0
1977-78	8,321	192.9	3,562	83.0	14,979	322.7	26,862	598.6
1978-79	8,071	202.0	2,568	64.3	16,901	394.0	27,540	660.2
1979-80	7,757	204.2	2,158	53.7	18,254	444.4	28,169	702.3
1980-81	6,343	171.1	2,202	56.6	18,977	501.6	27,522	729.3

More details of housing finance are contained in the publication *Housing Finance for Owner Occupation, Australia* (Catalogue No. 5609.0) issued by the Australian Statistician, Canberra.

CONSTRUCTION (OTHER THAN BUILDING) OPERATIONS

This series covers non-building construction such as roadworks, railways, bridges and earthworks. It comprises work by private contractors on construction (other than building) prime contracts (including alterations and additions) valued at \$100,000 or more at commencement of the contract. Construction undertaken by government authorities involving day labour, and own account construction by private sector enterprises are excluded.

Prime contracts are those where the contractor is legally liable to the owner of the project. The following table shows the number and value of such contracts classified by stage of construction.

NUMBER AND VALUE OF CONSTRUCTION (OTHER THAN BUILDING) PRIME CONTRACTS BY STAGE OF CONSTRUCTION

Period	Commenced		Completed		Under construction (a) r		Work done during period	Work yet to be done (a) r
	Number	\$m	Number	\$m	Number	\$m	\$m	\$m
1975-76	120	110	162	168	81	176	135	82
1976-77	167	111	129	102	117	205	107	106
1977-78	254	296	226	149	125	321	238	140
1978-79	186	120	221	290	89	202	249	63
1979-80	215	632	173	138	118	761	160	610
1980-81	247	383	239	203	125	1,023	297	778

(a) At end of period.

GOVERNMENT AND GOVERNMENT-SPONSORED HOUSING

Commonwealth Government

Commonwealth and State Housing Agreements. Legislation enabling agreements between the Commonwealth Government and State Governments to provide homes and associated finance

for persons in need of government assistance has been in existence in the form of various Commonwealth and State Acts since 1945.

The *Housing Assistance Act* 1981 was enacted to continue the provision of housing assistance after the termination of the *Housing Assistance Act* 1978. Except in specified circumstances the provisions of this agreement supersede the provision of earlier housing agreements. The latest agreement will expire on 30 June 1986.

The objective of this Agreement is to provide the States with financial assistance from the Commonwealth for rental housing and home purchase. The Agreement prescribed a base amount of \$200 million per annum for each of the five years, and provision exists for additional funding, to be determined annually in the Commonwealth Budget. The \$200 million base is made up of \$146 million Advances and \$54 million of Grants for Pensioner and Aboriginal Housing. The allocation to the States is on the basis of respective needs, as determined by the Commonwealth Minister.

The part of the Agreement relating to Home Purchase Assistance is similar to the previous Agreement. One slight amendment is that the ceiling interest rate that may be charged to purchasers is now tied to the Commonwealth Savings Bank rate in lieu of the long term Bond rate.

A more detailed account of the various Commonwealth and State Housing agreements is given on page 259 of the *Western Australian Year Book*, No. 19 — 1981 and in earlier issues.

Aboriginal Housing. The Commonwealth Government provides annual grants, through the Housing Assistance Act and the Department of Aboriginal Affairs, for the housing of Aboriginal people. In 1980-81 forty-four metropolitan and 107 country Aboriginal housing units were built.

Defence Services Homes Corporation. The *Defence Service Homes Act* 1918 is administered by the Defence Service Homes Corporation whose affairs are conducted and controlled by the Secretary to the Department of Veterans' Affairs. Details of the Scheme are available on page 261 of the *Western Australian Year Book* No. 20 — 1982 and previous issues.

A summary of the Corporation's activities in Western Australia for the six years 1975-76 to 1980-81 is given in the following table.

DEFENCE SERVICE HOMES SCHEME — OPERATIONS IN WESTERN AUSTRALIA

Year	Loans granted during year				Total	Net capital expenditure	Principal repayments of loans	Loan accounts at end of period
	Construction of homes	Purchase of new homes	Purchase of previously occupied homes	Enlargement of existing homes				
	No.	No.	No.	No.	No.	\$'000	\$'000	No.
1975-76	400	115	599	7	1,121	16,142	7,515	18,371
1976-77	540	43	190	7	780	11,880	7,598	18,117
1977-78	446	41	267	9	763	11,049	6,912	17,970
1978-79	238	57	236	9	540	7,836	7,848	17,540
1979-80	233	33	200	8	474	6,923	8,359	16,971
1980-81	269	48	333	18	668	12,506	9,127	16,569

Housing Loans Insurance Scheme. The Housing Loans Insurance Corporation was established by the *Housing Loans Insurance Act* 1965 (Commonwealth) to insure approved lenders against losses arising from the making of housing loans, and it is the largest mortgage insurer in both Australia and Western Australia. To 30 June 1981 insured loans in Western Australia amounted to \$1,525 million. Details of the operations of the Corporation for the six years ended 1980-81 are given in the following table.

**HOUSING LOANS INSURANCE CORPORATION
LOANS INSURED IN WESTERN AUSTRALIA**

Particulars		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Loans insured	No.	9,657	9,138	6,403	6,473	7,053	6,034
Amount of loans insured	\$'000	199,687	189,947	174,348	185,678	207,872	188,563

Home Savings Grants and Family Bonus. The purpose of the Commonwealth Government's Home Savings Grant Scheme is to help people to buy or build their first home. The scheme also aims at increasing the proportion of total savings available for housing by encouraging people to save with those institutions that provide the bulk of housing finance. The grant is a tax-free gift, not a loan.

The scheme was introduced in 1964. Persons who acquired their homes up to 31 December 1976 qualified under the *Homes Savings Grant Act 1964*, the details of which are available on page 257 of the *Western Australian Year Book*, No. 18 — 1980 and in earlier issues.

Persons acquiring their home on or after 1 January 1977 may qualify under the *Homes Savings Grant Act 1976* if they contract to buy or build, or commence to construct, their first home in Australia. In general there is no restriction on the age or marital status of the applicant, except that persons under eighteen years of age must be married or engaged to be married. A grant may be made towards a new or established house, home unit or flat. The grant is \$1 for each \$3 of acceptable savings held at the prescribed date. The main forms of acceptable savings are those held with savings banks, building societies, credit unions or on fixed deposit with trading banks, or invested in Australian Savings Bonds purchased as inscribed stock or for safe custody with a bank.

The maximum grants are \$667 and \$1,333 for homes that were acquired in 1977 and 1978 respectively. From 1 January 1979, grants of up to \$2,000 became payable for three years' savings ending on the prescribed date. However, persons with shorter savings' periods of one or two years may continue to qualify for the lower maximum grants of \$667 and \$1,333 respectively.

For persons who contracted to buy or build their first home in Australia from 1 January 1977 to 24 May 1979 there is no qualifying limit on the value of the home. A value limit applies, however, if the prescribed date is on or after 25 May 1979; details concerning this limit appear on page 263 of the *Western Australian Year Book*, No. 20 — 1982.

A person who is eligible for a grant and whose prescribed date is on or after 1 October 1980, may also be eligible for a family bonus. A family bonus of \$500 is payable for families with one dependent child and \$1,000 for families with two or more dependent children at their prescribed date.

The number and value of grants approved in Western Australia under the *Homes Savings Grant Act 1976* are shown in the following table.

**HOMES SAVINGS GRANT ACT 1976
GRANTS APPROVED IN WESTERN AUSTRALIA**

Period	Number	Value (\$)
Six months ended June 1977	669	430,850
Twelve months ended June —		
1978	4,053	2,806,782
1979	4,684	4,779,795
1980	4,054	4,624,027
1981	3,958	4,769,106

State Government

The State Housing Commission. The State Housing Commission was established in January 1947 by the State Housing Act of 1946 to replace the Workers' Homes Board which had been in

operation since 1912. The Act remained in force until repealed and replaced by the Housing Act of 1980. Further details of the repealed Act are given on page 259 of the *Western Australian Year Book*, No. 19 — 1981 and in earlier issues. Funds for the Commission's operations are provided by the State Government or raised through the creation and issue of debentures or of inscribed stock.

Eligibility for assistance is restricted to persons with income below a prescribed amount, the amount being subject to quarterly adjustment according to the movement in the seasonally adjusted national average weekly earnings. From 1 December 1982 the maximum weekly earnings were \$275.80 for the Perth Metropolitan region, \$389.30 for the North-West and Kimberley regions, and \$356.90 in other remote areas.

THE STATE HOUSING COMMISSION — DWELLINGS CONSTRUCTION

Category	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Housing units (a) completed —						
State Housing Act	377	160	251	—	—	—
Commonwealth and State Housing Agreements (b)	387	655	995	700	660	579
Aboriginal Housing	50	64	39	40	72	151
Departmental Homes	34	34	38	38	48	42
Government Employees' Homes	113	79	197	133	140	140
Shire Building Scheme (c)	11	—	11	14	5	1
Dwellings for Aged Pensioners (d)	64	78	52	51	104	176
Other (e)	24	13	17	19	49	25
Total	1,060	1,083	1,600	995	1,078	1,114
Other activities (f)	74	16	7	6	34	42

(a) Comprises number of houses and number of individual units in other dwellings. (b) For details see section *Commonwealth and State Housing Agreements* above. (c) For local government employees. (d) Constructed under the provisions of the *States Grants (Dwellings for Aged Pensioners) Act 1969*, the *State Grants (Dwellings for Pensioners) Act 1974* and Part III of the *Housing Assistance Act 1978*. (e) Comprises houses built by the Commission in terms of the *Industrial and Commercial Employees' Housing Act 1973-1977* and Project Development (Special Agreements Scheme) and other schemes. (f) The figures shown represent housing units built by charitable organisations for which the Commission provided design and supervisory services.

Government Employees' Housing Authority. The Government Employees' Housing Authority is established under the provisions of the *Government Employees' Housing Act 1964-1973* to provide adequate and suitable housing accommodation for employees of State Government Departments to which the Act applies.

Industrial and Commercial Employees' Housing Authority. The Industrial and Commercial Employees' Housing Authority is established under the provisions of the *Industrial and Commercial Employees' Housing Act 1973-1977* with the aim of providing adequate and suitable housing for key industrial or commercial employees in employment outside the Perth Metropolitan region.

During the year ended 30 June 1981 the Authority had assisted business organisations by providing 127 units of single detached accommodation dispersed over a wide area of the State.

Rural Housing Authority. The Rural Housing Authority is established under the provisions of the *Rural Housing (Assistance) Act 1976-1981*, to assist primary producers seeking finance to purchase or build a suitable dwelling or to add to or modernise an existing dwelling on their holding for themselves or an employee and his family.

A summary of the activities of the Authority is given in the following table.

RURAL HOUSING AUTHORITY OPERATIONS

Type of assistance	1977-78		1978-79		1979-80		1980-81	
	Number	\$'000	Number	\$'000	Number	\$'000	Number	\$'000
Loans made through permanent building societies	12	318	11	384	18	342	27	840
Direct advances by the Authority	27	665	15	396	39	1,014	32	1,000

State Housing Death Benefit Scheme Act. The *State Housing Death Benefit Scheme Act 1965-1975* establishes, with effect from 20 February 1965, a scheme to provide benefits for the families of purchasers of dwellings who die leaving unpaid the whole or part of a liability to the State Housing Commission under a contract of sale or mortgage.

Housing Loan Guarantee Act. The purposes of the *Housing Loan Guarantee Act 1957-1973* are to encourage, through provisions for guarantees and indemnities, the building and the purchasing of new houses. Under this Act, the Government provides guarantees to lenders of funds to building societies and other approved financial organisations making advances to persons desiring to purchase or build their own home on low deposits.

Additional details relating to the operations of the State Housing Commission and other Authorities can be found on pages 259-61 of the *Western Australian Year Book*, No. 20 — 1982 and in previous issues.

CONSTRUCTION INDUSTRY STATISTICS

Construction Industry Survey (Private Sector)

Statistics in this section were compiled from a sample survey of private sector construction establishments in respect of the year 1978-79. This was the first time that the ABS had obtained comprehensive information on the structure of the construction industry. The survey is part of the system of integrated economic censuses, further details of which are contained in the introduction to Chapter VIII.

The following table contains a summary of the principal private sector construction statistics by industry class for 1978-79.

PRIVATE SECTOR CONSTRUCTION ESTABLISHMENTS SUMMARY OF OPERATIONS BY INDUSTRY CLASS: 1978-79

Industry class	Number of establishments operating at 30 June	Average employment over whole year	Wages and salaries	Turnover	Value added
		Persons	\$'000	\$'000	\$'000
General construction establishments —					
Building construction —					
House construction	954	3,478	22,523	319,533	67,378
Residential building construction, n.e.c.	(a) 207	(a) 481	(a) 1,747	(a) 35,850	(a) 6,837
Non-residential building construction	(a) 293	3,333	37,907	287,921	61,136
Total	1,454	7,292	62,177	643,304	135,351
Non-building construction —					
Road and bridge construction	83	1,175	13,704	70,799	23,981
Non-building construction, n.e.c.	154	2,845	41,960	208,825	70,321
Total	237	4,020	55,664	279,625	94,302
Total, General construction establishments	1,691	11,312	117,841	922,929	229,653
Special trade construction establishments —					
Concreting	198	820	4,976	28,260	10,190
Bricklaying	453	1,051	(a) 3,007	14,199	8,616
Roof tiling	35	142	758	9,690	3,031
Floor and wall tiling	139	324	630	5,238	2,724
Structural steel erection	46	291	2,927	8,391	5,152
Plumbing	441	2,034	13,571	61,728	25,506
Electrical work	414	2,727	26,949	81,170	40,071
Heating and airconditioning	69	771	7,997	37,433	11,870
Plastering and plaster fixing	257	774	2,527	16,627	7,201
Carpentry	305	767	(a) 2,850	12,779	6,961
Painting	479	1,540	8,320	29,310	17,047
Earthmoving and dredging	162	1,168	11,611	48,237	21,742
Special trades, n.e.c.	360	1,441	8,895	47,525	18,891
Total, Special trade construction establishments	3,358	13,850	95,018	400,585	179,001
TOTAL CONSTRUCTION ESTABLISHMENTS	5,049	25,162	212,859	1,323,514	408,654

(a) Included for completeness, high standard error (i.e. in excess of 10 per cent).

The following table shows the value of construction work done by type of construction and commodity for private sector construction establishments 1978-79.

PRIVATE SECTOR CONSTRUCTION ESTABLISHMENTS — VALUE OF CONSTRUCTION
WORK DONE BY TYPE OF CONSTRUCTION BY COMMODITY: 1978-79
(\$'000)

Commodity	Trade contracting		General construction		Speculative construction
	Prime contract	Sub-contract	Prime contract	Sub-contract	
Building —					
Houses —					
New	6,145	77,287	254,663	(a) 1,209	20,823
Alterations, additions and improvements	9,374	7,115	(a) 29,642	(a) 827	—
Repairs and maintenance	20,366	(a) 2,865	(a) 6,890	(a) 80	—
Other residential buildings —					
New	637	10,274	(a) 35,303	(a) 45	(a) 13,250
Alterations, additions and improvements	689	1,471	(a) 2,603	—	—
Repairs and maintenance	3,312	(a) 362	(a) 708	—	—
Non-residential buildings —					
New work, alterations, additions and improvements to —					
Commercial buildings	7,867	42,775	98,546	3,217	510
Industrial buildings	7,747	30,759	67,266	718	(a) 63
Other buildings	6,622	26,635	92,814	(a) 463	—
Repairs and maintenance	13,713	1,678	7,002	(a) 100	—
Total, Building	76,470	201,219	595,437	6,658	(a) 34,645
Non-building construction —					
New work, alterations and additions to —					
Roads, highways and related structures	8,559	12,272	42,575	12,308	535
Bridges	463	(a) 88	5,550	368	—
Railways and tramways	812	(a) 42	5,731	56	—
Harbours	1,715	355	6,807	34	—
Dams, water supply pipelines	(a) 2,905	2,089	16,494	(a) 118	—
Electric power transmission lines	(a) 1,061	(a) 524	6,572	—	—
Electric power distribution lines	(a) 322	(a) 1,134	—	—	37
Water distribution systems	(a) 2,113	193	(a) 1,008	(a) 3	70
Sewer systems	(a) 2,824	5,549	12,110	908	144
Pipelines, n.e.c.	(a) 377	218	(a) 3,199	1,168	—
Street and highway lighting	231	—	—	—	—
Heavy electrical generating plant and equipment	(a) 180	2,001	16,088	713	—
Heavy industrial plant and equipment, n.e.c.	8,671	12,009	38,876	11,761	—
Telecommunications towers, lines and structures	(a) 39	(a) 54	(a) 72	(a) 45	—
Other	28,915	(a) 4,718	29,668	(a) 2,948	—
Repairs and maintenance to —					
Roads, highways and related structures	854	(a) 99	2,958	3,245	—
Bridges	2	3	393	151	—
Other	7,166	463	36,012	9,287	—
Total, Non-building construction	67,211	41,810	224,115	43,131	786
Demolition	412	(a) 57	(a) 5	—	—
TOTAL, CONSTRUCTION WORK DONE	144,093	243,086	819,558	49,790	(a) 35,431

(a) Included for completeness, high standard error (i.e. in excess of 10 per cent).

Scope. The scope of the survey included all private sector establishments and ancillary units predominantly engaged in construction activities, i.e. those establishments classified to the industries in Division E of the ASIC. Own house builders are excluded from the tables shown below. Only direct expenses incurred by own house builders were collected and this was estimated to be \$45 million for 1978-79.

Definitions. See the definitions of standard data items in integrated censuses in the Introduction to Chapter VIII. For the construction industry survey, *turnover* includes contract construction revenue and sales of speculative construction projects.

Precision of the Estimates. As the estimates are derived from returns received from a sample of establishments they may differ from the results which would have been obtained if the collection had been made from all establishments. A measure of the likely difference is given by the standard error for each estimate. There are about two chances in three that a sample estimate

will differ from the results that would be obtained from a comparable complete collection by less than one standard error, and nineteen chances in twenty that the difference would be less than two standard errors.

Some of the standard errors associated with the estimates are relatively high. Items chosen for inclusion in the previous tables, unless noted, have standard errors of less than 10 per cent. Users should check that the estimates are reliable enough for the particular purpose for which they require the statistics.

Construction Activity in the Public Sector

Separate details were collected in 1978-79 on the construction activities of all public sector enterprises engaged in construction activity to a significant extent (defined as those public sector enterprises with seven or more employees engaged in managing or undertaking construction activities).

The statistics provide some measure of the significance of construction activity undertaken by public sector enterprises using their own workforce.

The public sector construction activity data cannot be validly aggregated with private sector construction establishment data because of differences in the definition of construction units.

The following tables contain a summary of construction employment and expenditure by principal public sector enterprises for 1978-79. Data for Commonwealth Government activity in Western Australia are excluded from the tables.

STATE AND LOCAL GOVERNMENT ENTERPRISES AND CONSTRUCTION EMPLOYMENT 1978-79

Level of government	Number of enterprises	Construction employment						Total employment
		On-site			Other			
		Male	Female	Total	Male	Female	Total	
State Government	9	3,759	22	3,781	573	—	573	4,354
Local government —								
Municipal government	100	2,262	1	2,263	251	1	252	2,515
Other (semi-government)	2	3	—	3	—	—	—	3
Total, State and local government	111	6,024	23	6,047	824	1	825	6,872

STATE AND LOCAL GOVERNMENT ENTERPRISES — CONSTRUCTION EXPENDITURE: 1978-79 (\$'000)

Level of government	Project involving own employees			Projects not involving own employees Payments to contractors	Total selected construction expenses		
	Selected expenses				Building	Non-building	Total
	Wages and salaries	Internal plant hire	Other direct expenses				
State Government	49.145	12.969	110.196	154.791	62.221	264.880	327.101
Local government —							
Municipal government	19.048	7.353	17.772	14.854	13.229	45.797	59.026
Other (semi-government)	112	—	227	3.959	7	4.292	4.299
Total, State and local government	68.305	20.322	128.195	173.604	75.457	314.969	390.426

CHAPTER VIII — PRODUCTION

In this Chapter 'production' denotes those economic activities with output in the form of 'goods' or 'commodities' which will be marketed as raw materials, fuels, semi-processed articles or finished products.

The Chapter is divided into three Parts which deal with the major sectors of production as follows:

- Part 1 Agriculture, Forestry and Fishing
- Part 2 Mining
- Part 3 Manufacturing and Electricity and Gas.

The subdivision of the Chapter into Parts 1, 2 and 3 is based on 'industry divisions' in the Australian Standard Industrial Classification (ASIC), and also reflects the current stage of development of economic statistics whereby information presented in Part 2 and Part 3 comes mainly from a system of integrated economic censuses based on ASIC, whereas only some statistics in Part 1 have been included in this system. A brief description of ASIC and the system of integrated economic censuses is given below.

Australian Standard Industrial Classification (ASIC)

In 1978 the Australian Bureau of Statistics issued the 'Australian Standard Industrial Classification (1978 Edition)', or 'ASIC', which sets out a classification of all economic activities grouped into four levels of 'industry' in which the activities are primarily carried out. This replaced the 'Australian Standard Industrial Classification (Preliminary Edition)', which operated from 1969. A publication, *Key Between the 1978 and 1969 Editions of ASIC* (Catalogue No. 1209.0) is available on request from the ABS. At the broadest level of the classification, economic activities are grouped into the following 'industry divisions':

Division A Agriculture, Forestry, Fishing and Hunting

B Mining

C Manufacturing

D Electricity, Gas and Water

E Construction

F Wholesale and Retail Trade

G Transport and Storage

H Communication

I Finance, Property and Business Services

J Public Administration and Defence

K Community Services

L Recreation, Personal and Other Services

Each industry division is further divided into industry sub-divisions, groups and classes. An example from the Manufacturing division is given below:

Industry Division	: C	Manufacturing
Industry Sub-division	: 28	Non-Metallic Mineral Products
Industry Group	: 286	Clay Products and Refractories
Industry Class	: 2861	Clay Bricks

Economic units are classified to industry division, sub-division, group and class, in that order, based on the predominant activities among all the activities carried out by the unit concerned. The basic economic unit is the *establishment* which generally represents the total operations under one ownership at one physical location (e.g. a farm, a shop, a factory, a

mine). In some cases (e.g. construction and transport, electricity and gas production and distribution) the location constraint is relaxed to cover the total operations under one ownership. Some separately-located units which exist primarily to provide services to other establishments under the same ownership (e.g. separately-located administrative offices, laboratories, warehouses, manufacturers' sales offices not holding stocks, etc.) are regarded as *ancillary units* and are classified to the industry of the establishments served rather than to an industry based on the activity performed. If all the activities of all establishments and ancillary units under the same ownership are considered together the unit is described as the *enterprise*, or all the operations of a single entity in Australia. The final unit in the hierarchy is the *enterprise group* which is the group of legal entities owned or controlled by a single legal entity (e.g. a parent company and its subsidiaries as defined in the Companies Act).

Integrated Economic Censuses

In 1968-69 the Australian Bureau of Statistics commenced a programme of integrated economic censuses to replace or add to the range of existing censuses developed independently over many years. By employing standard definitions of data items as described below and by using the standard definitions of units and methods of classification set out in ASIC, the programme was designed to remove many inconsistencies, gaps and overlaps between existing censuses and thereby permit comparisons of data across broad sectors of economic activity.

Statistics published from the integrated economic censuses are mainly *establishment statistics* or statistics resulting from the aggregation of data for individual establishments and ancillary units. In this Chapter most of the statistics in Parts 2 and 3 are establishment statistics from integrated censuses and data for the standard items can be regarded as comparable between the two Parts. However, the sectors of production covered by Part 1 of this Chapter have not been fully included in the system of integrated economic censuses and consequently some of the statistics in Part 1 differ in scope from those in Parts 2 and 3. Tables showing enterprise structure, industry, etc. together with the table setting out estimates of turnover, expenditure, value added, etc. are based on fully integrated data, whereas the commodity statistics (area and production of crops, livestock numbers, etc.) are the traditional holding-based information which is collected irrespective of enterprise or establishment structure.

Enterprise Statistics. Since an enterprise is defined as a single legal entity, the use of the enterprise as the unit of aggregation provides statistics which are often of more value than establishment statistics in considering questions related to management and ownership. The statistics which result from the aggregation of enterprise data are different from establishment statistics since, for enterprises comprised of establishments operating in different industries, the industry classification of the enterprise depends on the respective contributions of each establishment to the value added of the enterprise. For example, an enterprise operating a mine and a factory contributes to both mining and manufacturing in establishment statistics whereas, in enterprise statistics, it is classified wholly to either mining or manufacturing depending on which establishment has the greater value added.

The concept of an enterprise has no geographical limits other than the requirement that only operations within Australia are included. For this reason enterprise statistics generally relate only to Australia as a whole and are not dissected into State components, except in Part 1 (Agriculture). Where published, such statistics show the number of enterprises in each ASIC industry class together with data for the standard set of establishment items described below, plus additional items collected only at the enterprise level such as rent and leasing revenue, land tax, rates and pay-roll tax, employer contributions to superannuation schemes, depreciation, interest and royalties (paid and received) and other expenses.

Standard Data Items in Integrated Censuses. A necessary part of the system of integrated economic censuses was the adoption of common definitions for data items common to all

censuses. Listed below are the definitions of the standard data items appearing in tables in Parts 1 to 3 of this Chapter.

Number of Establishments. The number of establishments as defined above operating at 30 June of each year. Numbers of separately-located administrative offices and ancillary units serving the establishments are not included.

Persons Employed. Working proprietors and employers on the pay-roll including those working at separately-located administrative offices and ancillary units.

Wages and Salaries. The wages and salaries of all employees including those at separately-located administrative offices and ancillary units. Amounts drawn by working proprietors are not included.

Turnover. Sales (exclusive of excise and sales tax) of goods, whether produced in the establishment or not, plus transfers out of goods to other establishments of the same enterprise, plus bounties and subsidies on production, plus all other operating revenue (such as commission, repair and service revenue), plus capital work done for own use, or for rental or lease. Rent and leasing revenue, interest income, royalties and receipts from the sale of fixed tangible assets are excluded.

Stocks. All the stocks of materials, fuels, etc. and finished goods and work-in-progress of the establishment, whether located at the establishments or elsewhere in Australia.

Purchases, Transfers In and Selected Expenses. Purchases of materials, fuel, power, stores, containers, etc. plus transfers in of goods from other establishments of the same enterprise, plus charges for commission and sub-contract work, repair and maintenance expenses, outward freight and cartage, motor vehicle running expenses and sales commission payments.

Value Added. Turnover, plus increase (or less decrease) in the value of stocks, less purchases, transfers in and selected expenses.

Rent and Leasing Expenses. Outlay on rent and leasing of buildings, vehicles, machinery, plant and equipment.

Fixed Capital Expenditure. Outlay on new and secondhand fixed tangible assets, less disposals, including expenditure on establishments not yet in operation.

Chapter VIII — continued

Part 1 — Agriculture, Forestry and Fishing

INTEGRATED AGRICULTURAL STATISTICS

Information from all units operating within the agricultural sector was obtained at a special census conducted in 1974 and used to create an additional data base, using the methodology of the Australian Standard Industrial Classification (ASIC) and compatible definitions with those of the Integrated Economic Censuses for Establishments, Enterprises and Enterprise Groups.

The identification of economic units within the agricultural sector has allowed the production of more meaningful statistics of economic size, legal status and industry classification. It has also provided some insight into the activities of agricultural enterprises in other sectors of the economy and the activities of non-agricultural enterprises in the agricultural sector.

The number of economic units operating in the agricultural sector, their industry, legal status and size together with a tabulation of certain financial aggregates are shown in the next three tables.

AGRICULTURAL ENTERPRISES — INDUSTRY AND LEGAL STATUS WESTERN AUSTRALIA: 1980-81

Industry of enterprise		Legal status						Total enterprises
ASIC code	Description	Sole operator	Family partnership	Other partnership	Private incorporated company	Public incorporated company	Other (a)	
0124	Poultry for meat	2	33	3	6	—	1	45
0125	Poultry for eggs	22	80	5	4	—	10	121
0134	Grapes	88	137	12	1	—	2	240
0135	Plantation fruit	20	69	4	1	—	—	94
0136	Orchard and other fruit	185	467	19	16	—	7	694
0143	Vegetables — Potatoes	27	162	1	—	—	1	191
0144	Vegetables — Other	127	416	11	7	—	2	563
0181	Cereal grains (incl. Oilseeds n.e.c.)	172	1,127	50	77	1	35	1,462
0182	Sheep/Cereal grains	564	4,823	147	261	2	113	5,910
0183	Meat cattle/Cereal grains	17	54	3	6	—	—	80
0184	Sheep/Meat cattle	152	685	20	37	2	18	914
0185	Sheep	384	1,524	82	131	—	31	2,152
0186	Meat cattle	505	1,186	64	105	1	21	1,882
0187	Milk cattle	74	519	12	15	—	6	626
0188	Pigs	31	151	16	4	—	1	203
0191	Sugar cane	—	—	—	—	—	—	—
0192	Peanuts	—	1	—	—	—	—	1
0193	Tobacco	—	—	—	—	—	—	—
0194	Cotton	—	—	—	—	—	—	—
0195	Nurseries	38	100	10	10	—	3	161
0196	Agriculture n.e.c.	128	250	25	18	—	7	428
Total (ASIC code 01)		2,536	11,784	484	699	6	258	15,767

(a) Includes co-operative societies, trusts and estates.

For those units within ASIC Subdivision 01: Agriculture, which operate land, industry classifications are determined annually by applying unit prices to each agricultural activity undertaken by individual units and by then assessing the predominant activity according to the estimated values derived. For units that do not operate land (e.g. beekeepers), industry classifications are determined by each operator's description of his activities.

For enterprise and establishment units, which are predominantly engaged in activities covered by ASIC Subdivision 01: Agriculture, referred to respectively as agricultural enterprises and agricultural establishments the procedure for determining industry classification is also used for size classification purposes. For each unit, an 'estimated value of operations' (which includes both agricultural and non-agricultural operations) is calculated.

The following table shows the number of agricultural enterprises classified according to estimated value of operations and legal status for the year 1980-81.

AGRICULTURAL ENTERPRISES
ESTIMATED VALUE OF OPERATIONS AND LEGAL STATUS
WESTERN AUSTRALIA: 1980-81

Estimated value of operations (\$'000)	Legal status						Total enterprises
	Sole operator	Family partnership	Other partnership	Private incorporated company	Public incorporated company	Other (a)	
2 — 9	700	1,101	69	36	—	26	1,932
10 — 19	428	862	45	39	—	16	1,390
20 — 29	264	726	27	19	—	4	1,040
30 — 39	186	674	31	22	1	9	923
40 — 49	181	640	22	25	—	10	878
50 — 59	132	725	28	30	—	11	926
60 — 74	184	1,086	36	39	1	18	1,364
75 — 99	186	1,489	52	63	1	25	1,816
100 — 149	149	2,032	63	142	1	56	2,443
150 — 199	61	1,078	34	97	—	31	1,301
200 and over	65	1,371	77	187	2	52	1,754
Total all size groups	2,536	11,784	484	699	6	258	15,767

(a) Includes co-operative societies, trusts and estates.

The following table shows estimates of turnover, expenditure, cash operating surplus, capital expenditure and indebtedness of agricultural enterprises for the years 1977-78 and 1980-81. The data are obtained from the Agricultural Finance Surveys which are conducted triennially by the Australian Bureau of Statistics. They contain economic statistics relating to agricultural industries which are comparable with those from the manufacturing, mining and retailing sectors of the economy. They differ from *value of agricultural commodities produced* data in the following ways.

- (1) Data relate only to enterprises whose predominant activity is agriculture, whereas *value of agricultural commodities produced* data relate to the value of the total recorded production of commodities in a given year regardless of the predominant activity of enterprise.
- (2) The information relates to transactions on a cash rather than an accrual basis for agricultural enterprises during specific financial years. It does not therefore relate to one specific crop, season, etc.

Separate sample estimates have been calculated for components and totals at all levels. Users should exercise care when using the data, as the sample estimation methods used may result in the aggregate of the component estimates not necessarily being the same as the separate estimates of the the total. Since the standard errors are, in general, lower for totals than for individual components, the totals can be taken to be a more reliable estimate than the addition of the component items.

Sample estimates may differ from results which have been obtained from a comparable complete collection. A measure of the likely difference is given by the standard error of the estimates. There are about two chances in three that a sample estimate will differ by less than one standard error from the figures that would have been obtained from a comparable complete collection, and about nineteen chances in twenty that the differences will be less than two standard errors. For example, if a sample survey gives an estimate of \$4,000 million and the

standard error of this estimate is 2 per cent i.e. \$80 million, then there would be two chances in three that a comparable complete collection would give a figure within the range of \$3,920 million to \$4,080 million, and nineteen chances in twenty that the figure would be within the range of \$3,840 million to \$4,160 million.

For a more detailed explanation of the methodology and terminology used the reader is referred to the bulletin *Agricultural Sector, Part IV, Financial Statistics 1980-81* (Catalogue No. 7507.0) published by the Australian Statistician, Canberra.

ESTIMATES OF TURNOVER, EXPENDITURE, CASH OPERATING SURPLUS, CAPITAL
EXPENDITURE AND INDEBTEDNESS OF AGRICULTURAL ENTERPRISES
WESTERN AUSTRALIA

Item	1977-78		1980-81	
	\$ million	Standard error %	\$ million	Standard error %
Sales from crops	342.7	4	710.6	3
Sales from livestock	200.3	5	372.1	5
Sales from livestock products	280.8	3	407.9	4
Rent and leasing revenue (other than land)	(a)		(a) 7.4	14
Other miscellaneous revenue	30.0	12	39.0	14
Turnover	854.7	2	1,536.9	2
Less Marketing expenses	85.9	3	201.0	3
Purchases of livestock	53.5	10	81.9	16
Payments for seed	8.4	29	8.0	9
Payments for fodder	20.1	7	35.1	9
Payments for fertiliser	82.4	3	149.1	4
Payments for crop and pasture chemicals	7.2	10	16.9	9
Payments for veterinary supplies and services	9.7	5	15.7	6
Payments for electricity	5.0	7	6.8	8
Payments for fuel	39.3	3	79.1	3
Water and drainage charges	1.4	15	3.8	11
Payments to contractors	36.8	5	55.3	7
Repairs and maintenance	61.9	4	94.6	4
Rent and leasing expenses (other than land)	(a)		(a) 29.0	12
Other selected expenses	15.2	8	24.5	10
Purchases and selected expenses	426.9	3	800.8	3
Value added (b)	400.0	5	727.7	5
Less Rates and taxes	12.7	4	19.1	4
Insurance payments	11.6	4	17.0	4
Other expenses	22.5	5	32.4	5
Rent and leasing expenses (other than land)	(a) 5.2	25	(a)	
Plus Rent and leasing revenue (other than land)	(a) 2.7	14	(a)	
Adjusted value added (b)	350.6	5	659.3	5
Less Wages, salaries and supplements	57.0	7	89.6	7
Gross operating surplus (b)	293.6	6	569.7	6
Less Interest, land rent paid	46.6	7	88.1	7
Plus Interest, land rent received	12.8	16	24.1	19
Cash operating surplus (c)	287.7	6	514.0	5
Total net capital expenditure	133.7	7	200.2	7
Loans by banks, pastoral and insurance companies	351.7	8	580.3	7
Loans under hire purchase and other instalment credit	67.9	11	91.4	14
Other amounts owing	132.9	15	198.9	19
Gross indebtedness	552.4	7	870.6	8

(a) 'Rent and leasing' was not included in *Turnover* or *Purchases and selected expenses* prior to 1980-81. (b) Includes estimate for increase in value of livestock. (c) Excludes estimate for increase in value of livestock.

VALUE OF AGRICULTURAL COMMODITIES PRODUCED

For agricultural production the *gross value* is based on the wholesale price realised in the market place. Where commodities are consumed at the place of production or where they become raw material for secondary industry within the State, these points of consumption are taken as the market places.

The '*local value*' is the value at the place of production and is obtained by deducting marketing costs from the gross value. Marketing costs comprise freight, cost of containers, commission, and other charges incurred in marketing. Gross values provide a reliable measure of the value of production of any particular commodity or group but when comparing or combining values for agricultural industries with those for secondary industries the value added series of financial statistics from the Agricultural Finance Survey should be used.

Gross values of the principal items are shown in the next table for each of the years 1975-76 to 1980-81.

Wheat was the most important item in 1980-81 with a gross value of \$508.7 million, followed by wool (including fellmongered and exported on skins) with \$410.6 million.

AGRICULTURAL COMMODITIES PRODUCED
GROSS VALUE OF PRINCIPAL ITEMS
(\$'000)

Commodity group and commodity	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Crops —						
Barley	52,399	60,910	68,352	69,141	74,179	71,164
Oats	32,700	28,906	31,100	30,319	28,817	46,980
Wheat	427,507	290,489	292,901	546,827	571,158	508,734
Hay (all kinds)	10,048	10,760	15,374	18,085	18,915	24,806
Pasture seed —						
Barrel medic	125	157	129	371	141	58
Subterranean clover	936	1,584	1,734	2,202	3,510	3,493
Nursery products (a)	4,682	5,939	7,868	10,475	10,209	12,048
Vegetables —						
Cauliflowers	1,600	1,933	2,419	4,060	3,393	4,910
Lettuce	1,192	1,220	1,900	2,054	2,128	2,022
Onions	1,221	1,342	1,529	2,324	2,716	3,265
Potatoes	12,320	11,247	9,532	12,875	14,839	16,616
Tomatoes	3,284	4,053	3,855	3,629	4,269	3,331
Fruit —						
Apples	12,594	12,323	11,443	16,464	17,968	18,335
Bananas	2,205	2,502	4,057	5,049	2,101	4,380
Oranges	1,281	1,620	2,009	1,612	1,909	2,302
Pears	1,161	2,202	1,326	1,729	2,085	2,101
Plums and prunes	1,167	1,460	1,782	1,958	2,092	2,089
Vine fruits	1,999	2,246	2,249	3,362	3,437	3,046
Livestock slaughtering —						
Cattle and calves	45,803	65,062	76,931	101,398	149,165	177,382
Sheep and lambs (b)	23,118	32,714	39,548	49,888	71,812	86,466
Pigs	18,211	18,348	18,994	21,500	27,205	35,944
Poultry	13,865	16,004	19,771	22,536	26,274	30,244
Livestock products —						
Wool (shorn and dead)	241,796	275,093	257,411	285,852	347,466	400,235
Whole milk (c)	20,660	23,274	25,539	36,549	41,865	52,692
Eggs	12,431	14,037	15,477	16,310	17,283	20,409
Honey	1,174	1,603	763	1,418	1,837	1,776

(a) Value of seedlings, cut flowers, bulbs, trees, etc. produced. (b) Less the value of fellmongered wool and wool exported on skins. (c) Includes Commonwealth Government subsidy.

SUMMARY OF AUSTRALIAN STATISTICS

The following table contains a selection of the principal statistics of agricultural production in each of the Australian States for 1980-81.

PRINCIPAL STATISTICS OF AGRICULTURAL PRODUCTION
AUSTRALIA: 1980-81

Particulars	Unit	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	Australia (a)
Agricultural establishments —								
Area	'000 ha	65,167	14,666	157,469	62,437	115,823	2,220	495,447
Principal crops —								
Wheat for grain —								
Area	'000 ha	3,345	1,431	727	1,445	4,333	2	11,283
Production	'000 tonnes	2,865	2,538	485	1,650	3,315	3	10,856
Barley for grain —								
Area	'000 ha	455	303	160	989	535	10	(b) 2,451
Production	'000 tonnes	413	418	170	1,158	504	18	(b) 2,682
Oats for grain —								
Area	'000 ha	363	219	14	105	382	9	1,093
Production	'000 tonnes	310	322	6	96	384	11	1,128
Hay all types —								
Area	'000 ha	209	497	39	161	240	64	1,214
Production	'000 tonnes	594	1,894	196	440	703	249	4,084
Onions —								
Area	hectare	748	733	756	1,062	232	431	3,963
Production	tonne	18,821	15,164	22,605	28,537	11,680	17,948	114,755

PRINCIPAL STATISTICS OF AGRICULTURAL PRODUCTION
AUSTRALIA: 1980-81 — *continued*

Particulars	Unit	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	Australia (a)
Potatoes —								
Area	hectare	6.262	13.702	5.751	3.751	1.920	4.335	35.721
Production	tonne	86.526	348.950	113.339	96.748	64.308	155.965	865.836
Other vegetables —								
Area	hectare	13.546	13.543	20.003	2.932	3.484	9.692	63.309
Apples —								
Number of trees	'000 trees	1.262	1.335	951	535	800	1.212	6.099
Production	tonne	60.993	77.047	23.086	18.460	51.157	76.033	306.921
Pears —								
Number of trees	'000 trees	154	1.111	106	118	92	42	1.622
Production	tonne	6.773	121.734	2.577	6.872	5.592	2.095	145.643
Oranges —								
Number of trees	'000 trees	2.875	828	236	1.721	211	—	5.872
Production	tonne	188.264	53.603	20.308	155.009	7.303	—	424.494
Vineyards —								
Area	hectare	14.257	20.756	1.582	30.417	2.446	57	69.518
Grapes (all purposes)	tonne	167.521	262.003	5.391	297.121	11.256	129	743.421
Livestock numbers, 31 March 1981 —								
Sheep and lambs	'000	46.000	25.487	10.620	17.056	30.764	4.380	134.407
Cattle	'000	5.459	4.313	9.925	1.091	2.034	658	25.168
Pigs	'000	787	400	502	394	289	54	2.430
Livestock slaughtered for human consumption —								
Sheep	'000	4.164	5.115	706	1.864	2.912	403	15.241
Lambs	'000	5.515	6.433	626	1.685	1.555	647	16.720
Cattle	'000	1.864	1.670	1.897	473	633	182	6.965
Calves	'000	321	753	252	66	26	42	1.463
Pigs	'000	1.191	1.149	838	519	426	89	4.240
Wool production	mil. kg	220.6	146.3	46.5	102.8	163.8	20.0	700.4
Whole milk production —								
All purposes	litres	778	3.065	516	319	214	289	5.181
Gross value of agricultural production	\$'000	3,074.049	2,771.088	2,411.435	1,321.541	1,686.586	274.447	11,610.461

(a) Includes Northern Territory and Australian Capital Territory except where indicated: see footnote (b). (b) Incomplete; excludes Northern Territory and/or Australian Capital Territory.

The gross value of agricultural commodities produced for Australia in 1980-81 amounted to \$11,610 million, of which Western Australia contributed \$1,686.6 million or 14.5 per cent of the total. The major contributor was New South Wales with \$3,074.0 million or 26.5 per cent.

The total area of agricultural establishments in Australia was 495,447,000 hectares. Agricultural establishments in Queensland occupied the largest area (157,469,000 hectares), followed by Western Australia (115,823,000 hectares). Western Australia, with 4,333,144 hectares, had the largest area under wheat for grain in 1980-81.

SEASONAL CALENDAR

The following calendar is intended to show the main periods when principal agricultural and pastoral activities are carried out in Western Australia. Operations are generally confined to the periods shown but are subject to variation according to such factors as geographical location within the State, the variety of seed sown (or trees and vines planted) and exceptional seasonal conditions.

SEASONAL CALENDAR

Item	Period	
	Sowing or planting	Harvesting
Pastures —		
Clovers	April to June	December to April
Medics	April to June	December to April
Grain —		
Wheat	May to mid-July	November to January
Oats	May and June	November and December
Barley	May to July	November and December
Rye	May and June	November and December
Sweet Lupins	April to June	November to January
Hay —		
Wheaten	May and June	October and November
Oaten	April to June	October and November
Linseed	May to July	December and January
Vegetables —		
Beans, Runner —		
Carnarvon area	March to September	May to November
Perth Division	August to March	November to June
Green Peas —		
For processing	May to September	October to December
Fresh	May to September	August to December
Potatoes —		
Early planting —		
Perth and South-West	June and July	October to December
Mid-season planting —		
Perth, South-West and Lower Great Southern	July to November	November to March
Late planting —		
South-West and Lower Great Southern	November to February	February to June
Onions	March to November	September to April
Tomatoes —		
Carnarvon and Geraldton areas	February to August	May to December
Other areas	June to February	October to June
Fruit —		
Apples	June to August	February to May
Apricots	June and July	December and January
Bananas	September to March	July to June
Lemons	July and August	July to June
Mandarins	July and August	May to September
Nectarines	June and July	January and February
Olives	July and August	March and April
Oranges, Navel	July and August	May to September
Oranges, Valencia	July and August	August to February
Peaches	June and July	December to March
Pears	June and July	February and March
Plums	June and July	December to March
Grapes —		
For table use	July to September	January to May
For wine making	July to September	February to April
For drying	July to September	February
Shearing and lambing —		
Shearing —		
Pastoral areas	March to August	
Agricultural areas	February to November	
Lambing —		
Pastoral areas	April to July	
Agricultural areas	April to September	

LAND UTILISATION ON AGRICULTURAL ESTABLISHMENTS

In 1980-81 there were 18,165 agricultural establishments in the State, comprising 116 million hectares of land or about 46 per cent of the total area of Western Australia.

In recent years, the Australian Bureau of Statistics has been gradually excluding from the statistics those establishments which make only a small contribution to overall agricultural production.

Since 1976-77, establishments with agricultural activity have been included in the statistics if the operating enterprise had, or was expected to have an estimated value of agricultural operations of \$1,500 or more. In 1981-82, this figure was raised to \$2,500.

While these changes have resulted in some changes in the counts of numbers of establishments, the effect on the statistics of production of major commodities is small. Statistics of minor commodities normally associated with small scale operations may be affected to a greater extent.

Of the total area of agricultural establishments, over 5.5 million hectares were used for crops and 6.9 million hectares were under sown pasture in 1980-81. The balance consists mainly of uncleared land (most of which is pastoral leases held by sheep and cattle stations), but it also includes cleared land used for grazing or which was resting during the season, fallowed areas, newly cleared land and small areas of lucerne.

Land development in the post-war period was stimulated by generally favourable prices for agricultural and pastoral commodities. Special concessions to primary producers under the provisions of the taxation legislation also contributed to the increased capital investment in primary industry. This development, undertaken principally by established farmers and by the War Service Land Settlement Board, was aided by the introduction of modern mechanical methods of land clearing. As a result, the area of land used for crops increased from 1.4 million hectares in 1946-47 to 5.5 million hectares in 1980-81. This is the largest area of crops recorded in Western Australia. The area under sown pastures expanded from 0.8 million hectares in 1946-47 to 6.9 million hectares in 1980-81.

Details of land utilisation in the six years to 1980-81 are given in the next table together with the number of active agricultural establishments. When examining the following tables the effect of the change in definition explained above should be borne in mind.

LAND UTILISATION

Season	Active agricultural establishments (number)	Land use during the season (hectares)				Total area of establishments (hectares)
		Used for crops	Under sown pastures (all purposes)	Lucerne (all purposes)	Balance of establishments	
1975-76	18,871	4,207,158	7,447,823	15,367	104,618,561	116,288,909
1976-77	17,817	4,416,434	7,053,802	12,560	103,738,536	115,221,332
1977-78	17,767	4,910,100	7,203,923	9,817	102,366,792	114,490,632
1978-79	17,747	4,993,049	7,522,673	9,605	103,721,207	116,246,534
1979-80	(a) 18,395	5,279,875	7,132,526	8,700	102,502,122	114,923,223
1980-81	(a) 18,165	5,545,835	6,933,198	6,631	103,337,321	115,822,985

(a) Includes beekeepers without land.

The following table shows a classification of agricultural establishments according to size of establishment for 1980-81. For the State as a whole the largest group of establishments is in the size range 1,000 to 1,999 hectares and the 3,824 establishments concerned represent 21 per cent of the total number of establishments in the State.

The next largest group is establishments in the range 2,000 to 2,999 hectares and the 1,561 establishments in this category account for over 8 per cent of the total. Just under 13 per cent of all establishments are under twenty hectares in size.

In the 'agricultural areas' there were 17,486 establishments for a total area of 23,951,674 hectares of land. In the 'pastoral areas' there were 679 establishments comprising an area of 91,871,311 hectares. Further details of 'pastoral areas' appear later in this Part.

The agricultural areas comprise the Perth, South-West, Upper Great Southern, Lower Great Southern and Midlands Statistical Divisions and the Sub-divisions of Dundas and Greenough. The pastoral areas comprise the Kimberley and Pilbara Divisions and the Sub-divisions of Lefroy, Gascoyne and Carnegie.

CLASSIFICATION OF AGRICULTURAL ESTABLISHMENTS
ACCORDING TO SIZE OF ESTABLISHMENT: SEASON 1980-81

Area of establishments	In agricultural areas		In pastoral areas		Whole State	
	Number of establishments	Area	Number of establishments	Area	Number of establishments	Area
hectares		hectares		hectares		hectares
(a) 0	131	—	1	—	132	—
1 — 4	984	2.627	28	74	1,012	2,701
5 — 9	550	3.691	74	513	624	4,204
10 — 19	513	7.035	53	702	566	7,737
20 — 29	305	7.149	20	433	325	7,582
30 — 39	240	8.177	5	165	245	8,342
40 — 49	424	18.073	2	80	426	18,153
50 — 74	650	40.160	4	236	654	40,396
75 — 99	502	43.030	3	251	505	43,281
100 — 124	448	50.057	2	218	450	50,275
125 — 149	362	49.347	—	—	362	49,347
150 — 199	607	104.502	7	1,220	614	105,722
200 — 249	566	125.225	3	648	569	125,873
250 — 299	433	118.769	3	799	436	119,568
300 — 399	670	231.378	2	782	672	232,160
400 — 499	702	310.755	3	1,318	705	312,073
500 — 749	1,278	792.795	4	2,433	1,282	795,228
750 — 999	1,391	1,204.000	4	3,458	1,395	1,207,458
1,000 — 1,999	3,816	5,455.912	8	11,940	3,824	5,467,852
2,000 — 2,999	1,560	3,775.810	1	2,019	1,561	3,777,829
3,000 — 3,999	686	2,358.194	2	6,676	688	2,364,870
4,000 — 4,999	290	1,287.374	1	4,028	291	1,291,402
5,000 — 9,999	298	1,901.310	4	28,250	302	1,929,560
10,000 — 19,999	41	502.736	5	68,073	46	570,809
20,000 — 29,999	5	113.940	5	129,597	10	243,537
30,000 — 49,999	8	331.833	13	538,233	21	870,066
50,000 and over	26	5,107.795	422	91,069,165	448	96,176,960
Total	17,486	23,951,674	679	91,871,311	18,165	115,822,985

(a) Comprises beekeepers without land.

In the next table details of rural land utilisation according to statistical division are given for 1980-81. The statistical divisions (and their component local government areas) were revised with effect from 1 January 1976. Maps showing the boundaries of the statistical divisions appear inside back cover.

LAND UTILISATION IN EACH STATISTICAL DIVISION: 1980-81

Statistical division	Land use during the season (hectares)					Total area of establishments (hectares)
	Active agricultural establishments (number)	Used for crops (a)	Under sown pastures	Lucerne (all purposes)	Other	
Perth	2,408	7,159	66,949	302	50,525	124,935
South-West	3,516	42,902	634,356	1,618	242,575	921,451
Lower Great Southern	3,001	540,427	1,638,660	553	719,679	2,899,319
Upper Great Southern	2,305	981,512	1,443,652	83	947,926	3,373,173
Midlands	4,076	2,508,325	1,812,581	89	3,013,272	7,334,267
South-Eastern	883	322,663	668,752	3,884	17,559,722	18,555,021
Central	1,746	1,139,206	654,883	95	39,882,531	41,676,715
Pilbara	81	9	100	—	15,472,025	15,472,134
Kimberley	149	3,632	13,265	7	25,449,066	25,465,970
Total	18,165	5,545,835	6,933,198	6,631	103,337,321	115,822,985

(a) Excludes areas of sown pastures and of lucerne cut for hay or harvested for seed.

AGRICULTURE

Wheat

Although wheat has been grown from the earliest years of settlement, cultivation was confined to limited areas as late as 1890 when an area of approximately 14,000 hectares was

grown. By 1980-81, the area sown had risen to 4.3 million hectares; the largest area ever sown to wheat in the State.

A summary of the history of the wheat industry in Western Australia, which covers the development of new areas; the effects of such factors as the decline in the goldmining industry, government land settlement policies and introduction of new marketing practices is contained on pages 365-7 of the *Western Australian Year Book*, No. 20 — 1982.

WHEAT FOR GRAIN — AREA AND PRODUCTION

Season	Area sown	Production		
		Total	Average yield per hectare	Gross value
	hectares	tonnes	tonnes	\$'000
1900-01	29.947	21.092	0.70	310
1910-11	235.527	160.517	0.68	2.162
1920-21	516.379	333.336	0.65	11.023
1930-31	1.600.938	1.456.141	0.91	12.201
1940-41	1.062.301	573.159	0.54	8.648
1950-51	1.288.925	1.358.056	1.05	65.328
1960-61	1.627.242	1.739.074	1.07	92.290
1970-71	2.361.146	2.956.969	1.25	153.227
1975-76	3.171.289	4.122.011	1.30	427.507
1976-77	3.313.942	3.248.780	0.98	290.489
1977-78	3.608.871	2.945.461	0.82	292.863
1978-79	3.705.610	4.399.520	1.19	546.827
1979-80	4.120.784	3.739.139	0.91	571.158
1980-81	4.333.144	3.315.248	0.77	508.734

Size Classification of Wheat Farms. In 1965-66, of the 22,853 agricultural establishments of all types in the State, wheat for grain was grown on 9,267 or 40.6 per cent of the total. For 1968-69, the percentage decreased slightly to 40.1 per cent. In 1974-75 wheat for grain was grown on 7,899 or 38.5 per cent of the 25,500 agricultural establishments of all types in the State.

Of the 18,165 agricultural establishments of all types in the State in 1980-81, wheat for grain was grown on 7,870 or 43.3 per cent of the total. Establishments growing between 1 and 399 hectares of wheat for grain accounted for 52 per cent of the establishments but only 16 per cent of the total area, whereas establishments growing 400 or more hectares accounted for only 48 per cent of establishments but 84 per cent of the total area sown to wheat for grain.

ESTABLISHMENTS GROWING WHEAT FOR GRAIN CLASSIFIED ACCORDING TO AREA SOWN SEASON 1980-81

Area of wheat for grain	Number of establishments	Total area sown to wheat for grain
hectares		hectares
1 — 9	132	596
10 — 19	141	1.878
20 — 29	154	3.509
30 — 39	103	3.414
40 — 49	185	7.875
50 — 74	308	18.651
75 — 99	267	22.787
100 — 149	584	70.193
150 — 199	497	84.298
200 — 249	614	134.045
250 — 299	428	115.441
300 — 399	718	243.968
400 — 499	777	338.737
500 — 749	1,095	666.591
750 — 999	623	530.415
1,000 — 1,499	695	825.677
1,500 and over	549	1,265.069
Total	7,870	4,333,144



PLATE 5 — An air seeder being loaded. Present day air seeders, largely an Australian development, can plant about 145 hectares of crop in a 20-hour day. In comparison, the old horse-drawn combine would plant about 15 hectares in a 10-hour day.

Department of Agriculture

PLATE 6 — A modern self-propelled harvester in a wheat crop at Xantippe.

Department of Agriculture



PLATE 7 — The CBH Kwinana Grain Terminal is the largest wheat terminal in the world.

Co-operative Bulk Handling Ltd.





PLATE 8 — Sugar cane growing on the Ord River. Research by the Department of Agriculture at the Kununurra Pilot Farm indicates that sugar may be considered the crop with the greatest potential on the Ord.

Department of Agriculture



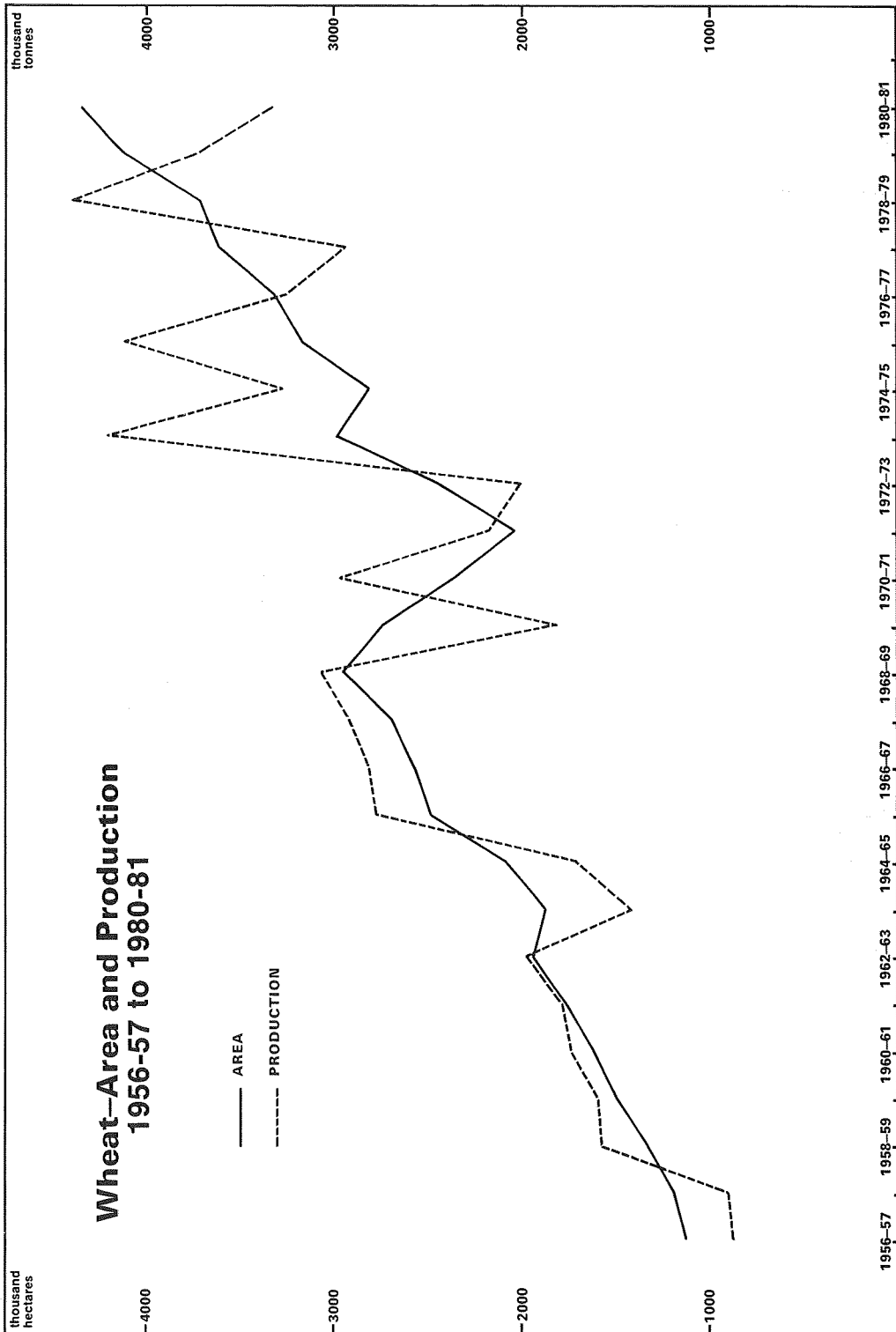
PLATE 9 — Lupins are a seed crop of increasing importance, with the industry based largely on sweet, white-seeded, white-flowered varieties of the narrow-leaved lupin (*Lupinus angustifolius*).

Department of Agriculture

PLATE 10 — The live sheep carrier 'Al-Qurain' loading sheep at Fremantle.

Department of Agriculture





Wheat Varieties. Information on wheat varieties is now collected on a triennial basis. Of 3,728,233 hectares sown to wheat in 1978-79 (latest information available) whether for grain, hay or green fodder, 1,900,469 or 51.0 per cent were sown to Gamanya. The next most popular variety of wheat, in terms of area sown, was Madden with 485,595 hectares or 13.0 per cent of the total. These are both high quality bread varieties suitable for the Australian Standard White (ASW) and Australian Hard grades of wheat.

Bulk Handling of Wheat. The rapid increase in the production and export of wheat between 1910 and 1920 caused problems of transport and storage, and proposals for the bulk handling of the grain led to the formation of a company for this purpose in 1920. Since then there have been constant attempts made to find cheaper methods of storage and transportation of wheat.

A series of experiments in the 1930s led to the development of a bulk handling system and the grower co-operative company, Co-operative Bulk Handling Limited, was set up in 1933 to operate the system.

In subsequent years the system was expanded and refined to the extent that at 31 December 1981, storage capacity in country areas was 8,414,800 cubic metres and at Western Australian ports 2,558,500 cubic metres. The initial storage constructed in 1931 provided for 23,276 cubic metres. The largest seasonal production that Co-operative Bulk Handling Limited has handled was 6,960,400 cubic metres of all grains in the 1978-79 season. By contrast, in the initial season the system handled 46,000 cubic metres.

A detailed account of the history of Co-operative Bulk Handling Limited's method of operation and the techniques developed for handling the State's wheat production is given on pages 369-70 of the *Western Australian Year Book*, No. 20 — 1982.

Marketing of Wheat. The Australian Wheat Board is the sole authority for the marketing of wheat within Australia and of wheat and flour for export. The Board derives its authority from the *Wheat Marketing Act* 1979 established under joint Commonwealth and State legislation and applies to the season which commenced on 1 October 1979, and each of the next six succeeding periods of 12 months.

With the introduction of the new Act a Guaranteed Minimum Delivery Price replaced the first advance payment of previous years. The GMDP guarantees growers a minimum price of 95 per cent of the average of net pool returns of the current year and the two preceding years converted to a net basis. Movements in the GMDP from one season to the next are limited to 15 per cent.

A wheat finance fund has been established with a ceiling of \$100 million; moneys held in the previous Stabilization Fund have been transferred to the new fund and growers are levied \$2.50 per tonne.

Home Consumption Price of Wheat. The legislation provides that the basic class of wheat to be marketed by the Board is 'Australian Standard White' which means wheat other than —

- (a) wheat that, having regard to its general characteristics, is classified by or on behalf of the Board, for the purposes of this interpretation, as being included in a particular category of wheat; or
- (b) wheat that is classified by or on behalf of the Board, for the purposes of this interpretation, as having a quality defect;

For the year commencing 1 December 1979 or any of the four succeeding years the Commonwealth Minister for Primary Industry is required by the *Wheat Marketing Act* 1979, after consultation with the appropriate Minister in each State, to fix a price per tonne for wholesale sales in Australia by the Board for each year, of Australian Standard White wheat in bulk, free on rail at a port of export.

The Wheat Marketing Act 1979 also requires the Commonwealth Minister for Primary Industry to fix the price for human consumption in respect of a year in the above-mentioned five year period by —

- (a) taking as a basis an amount of \$127.78 per tonne for the first season.
- (b) making such adjustments for succeeding seasons by using the formula included in the Schedule to the Act.

There shall be added to the above by the Minister in consultation with the Board an amount that is considered necessary to enable the Board to meet the costs of shipment of wheat to a port in Tasmania.

The price for Australian Standard White wheat for stockfeed and industrial use is to be determined from time to time by the Board in respect of the relevant use.

The human consumption prices for the 1980-81 and 1981-82 seasons were \$156.12 and \$187.20 per tonne respectively.

Wheat Standards. The Western Australian Wheat Standards Committee establishes standards for Australian Standard White (W.A.) wheat and Australian Hard (W.A.) wheat. The procedure approved for determining these standards of wheat provides for samples being drawn progressively at each country receipt point and port of shipment during the harvest period. After all samples are assembled they are sorted into zones of origin (Geraldton, Fremantle, Bunbury, Albany and Esperance), the zones being fixed in relation to each siding's natural port terminal. Each zone is then taken separately, the samples from the sidings in the zone being bulked together and thoroughly mixed and it is from these mixtures that each zone's contribution to the main bulk sample for the State is drawn.

Zone contributions are then bulked together and thoroughly mixed, after which ten weighings are taken on a Schopper one-litre scale chondrometer and from the average of those weighings the standards for the season are declared. Subsequently, the wheat is subjected to mechanical and quality tests.

Official standard samples are widely distributed to commercial interests and appropriate Government Departments and instrumentalities both locally and overseas, as being representative of the wheat of the particular season which is on offer to the world grain markets.

Wheat Delivery Quotas Plan. The Australian Wheat Grower's Federation put forward proposals, in March 1969, for the allotment of quotas on deliveries of wheat to the Australian Wheat Board. The Federation's proposals were mainly designed to bring marketable supplies of wheat more into line with available outlets, following the record Australian and State harvests in 1968-69. The proposals, which first became effective for the 1969-70 harvest, established for Western Australia a quota of 2.3 million tonnes for deliveries of wheat for that season.

State Governments have the responsibility of implementing the quota plan within the States and separate enabling legislation has been enacted in each State. Particulars of the statutory provisions relating to the establishment in Western Australia of a quota scheme with respect to the delivery and marketing of wheat, are contained in the Wheat Delivery Quotas Act which provided for the establishment of a Wheat Quotas Committee of three members appointed by the Minister for Agriculture. Subject to the direction of the Minister, the Committee is empowered under the Act to determine individual quotas for growers, but quotas may be reviewed by the Minister at any time.

For the season 1973-74 the State's allocation was set at 3.1 million tonnes. However, complementary State and Commonwealth legislation provided that the Australian Wheat Board 'may have regard to the possibility that the Australian wheat quota originally determined for that season, may be increased by a quantity not exceeding 544,311 tonnes'.

All wheat accepted as 'quota wheat' is the subject of normal Australian Wheat Board payments within the framework of the Wheat Industry Stabilization Act.

The 1975-76 season was declared a non-quota season by the Commonwealth Minister for Primary Industry and consequently there was no restriction whatsoever on the quantity of wheat which a grower might deliver. However, the State Minister for Agriculture approved a recommendation to maintain a base quota (for possible use in subsequent seasons) for individual properties.

All the seasons since 1975-76 have been declared non-quota years with the continuation of the guide-lines of adjusting individual base quota records by adding to 80 per cent of the previous years figure 20 per cent of the wheat delivery made.

Further details of the State's wheat quotas and of the method of allocation are given on pages 346-7 of the *Western Australian Year Book*, No. 17 — 1979.

Exports of Wheat

EXPORTS OF WHEAT AND FLOUR

Year	Wheat	Flour (a)	Estimated total wheat equivalent
	tonnes	tonnes	tonnes
1929-30	679,116	62,659	767,466
1939-40	417,226	83,159	534,344
1949-50	585,417	105,065	733,558
1959-60	999,173	79,697	1,111,546
1969-70	1,814,774	31,173	1,858,727
1975-76	3,215,792	11,658	3,232,230
1976-77	3,009,101	11,355	3,025,112
1977-78 (b)	3,795,969	7,888	3,807,091
1978-79 (b)	2,208,985	6,146	2,217,651
1979-80 (b)	4,205,774	4,342	4,211,896
1980-81 (b)	2,634,933	4,948	2,641,910

(a) Ships' stores are excluded from figures for 1959-60 and subsequent years. (b) Excludes interstate details.

Most of Western Australia's wheat production is exported as grain and flour and in the above table the fluctuations which have occurred in exports since 1929 are shown, together with figures giving the estimated total wheat equivalent. Prior to the early 1970s the United Kingdom had been a most consistent purchaser of the State's wheat but, since 1973-74 no exports to the United Kingdom have been recorded. Since 1961-62 China, excluding Taiwan Province, and Japan have been the most important customers and in 1969-70 their purchases together accounted for 78 per cent of the State's total wheat exports. In 1980-81 their combined purchases were 36 per cent of the State's total exports, Japan being the most important customer with purchases amounting to 553,761 tonnes. In 1980-81 principal buyers (other than Japan), in order of importance, were China, excluding Taiwan Province, Indonesia, Iran, Yemen Arab Republic and Kuwait. In the same year the principal customer for flour was Mauritius. Further details of exports appear in Chapter IX, Part 1.

Plant breeding has been a major activity of the Department of Agriculture for many years and new varieties have been released as developed. In 1982, five new wheats, Jacup, Canna, Bodallin, Eradu and Wialki were released for special areas and uses. Wialki is a hard grain limited to the Australian Hard (WA) grade, while the others are suited to the Australian Standard White (WA) grade. All are higher yielding than the established varieties in the areas for which they have been released.

Oats

Although oats have been grown in Western Australia since the early development of wheat farming, cultivation was somewhat limited until stimulated by the introduction of large-scale sheep raising in the agricultural areas, when their high nutritional worth as stock feed made

them a very valuable crop. The area sown to oats for grain increased from 78,301 hectares in 1920 to a peak of 538,153 in 1960. It then remained reasonably static until 1972 when the area sown to oats fell to 296,666 hectares. The fluctuations which have occurred in the area sown to oats for grain in recent years are shown in the table below.

Locally bred varieties of oats feature prominently in the industry. West and Swan, which are both high yielding varieties, are sown on about 75 per cent of the area. A new variety, Moore, better suited to the wetter Western Districts where it out-yields both West and Swan, was released in 1978, and Hill, a still better yielding variety, was released for the same areas in 1982.

In addition to their importance as local stock feed, oats are exported in substantial quantities. In 1980-81, 36,000 tonnes were sold by the Grain Pool to Japan and this constituted most of the oats exported in that season.

Although growers are free to market oats in any way they wish, in practice a large proportion of all sales, whether for export or the local market, was effected through the Western Australian State Voluntary Oats Pool, which was conducted by The Grain Pool of W.A. On 28 November 1975, oats became an 'approved grain' under the provisions of the *Grain Marketing Act 1975*. This meant that all oats delivered to Co-operative Bulk Handling Limited were deemed to have been received on behalf of the Grain Pool of W.A. However, since 31 October 1980 oats ceased to be an 'approved grain' thus bringing to an end the Western Australian State Voluntary Oats Pool with a 'warehousing' system being introduced on a three year trial basis. Since then, two seasons have passed and the Grain Pool of W.A. has remained the major exporter of oats in this State.

OATS FOR GRAIN — AREA AND PRODUCTION

Season	Area	Production		
		Total	Average yield per hectare	Gross value
	hectares	tonnes	tonnes	\$'000
1975-76	319,877	385,670	1.21	32,700
1976-77	372,299	347,396	0.93	28,906
1977-78	414,978	415,645	1.00	31,100
1978-79	427,494	490,884	1.15	30,319
1979-80	369,553	399,272	1.08	28,817
1980-81	381,971	383,570	1.00	46,980

Barley

Barley grows well over a wide range of climatic and soil conditions and generally yields better than other cereals. It is more successful on saline soils where other crops may not do well and as a first crop on newly-developed land. With the introduction of wheat delivery quotas, and because barley was a suitable alternative crop, the area of barley sown for grain rose to a record 911,318 hectares in 1971-72 but the relaxation of wheat quotas in the following years caused a contraction in the area sown to barley.

Both 'two-row' and 'six-row' barley are grown and, while a large amount of the grain produced is retained on farms for stock feed, the bulk of the crop is now exported. In 1980-81 the quantity exported overseas was 241,630 tonnes, the principal buyers being the Union of Soviet Socialist Republics and Japan. For many years sales of 'two-row' barley were mainly to local maltsters. However, since 1968-69 exports of 'two-row' barley have become increasingly important. Most 'six-row' barley sold continues to be marketed overseas.

Clipper variety barley is recommended for all areas for producing 'two-row' malting, manufacturing and feed grades of barley. Alternative acceptable varieties are Dampier for 'two-row' manufacturing and feed and the Beecher variety for 'six-row' feed. Dampier is lower yielding than Clipper in most areas and is not sought by overseas markets to the same extent as Clipper.

Forrest variety was registered in 1980 for release as a feed barley for farmers in south coastal areas. It is scald, net blotch and mildew resistant with markedly reduced head loss in comparison to Clipper. It out-yields Clipper in extensive areas of the State. Another high yielding feed barley, Stirling, was released in 1982.

The Grain Pool of W.A. is the sole marketing authority for barley in Western Australia and is responsible for the marketing of barley for both export and local consumption in accordance with the *Grain Marketing Act 1975*. The licensed receiver for the Grain Pool is Co-operative Bulk Handling Limited.

BARLEY FOR GRAIN — AREA AND PRODUCTION

Season	Two-row				Six-row			
	Area	Production			Area	Production		
		Total	Average yield per hectare	Gross value		Total	Average yield per hectare	Gross value
	hectares	tonnes	tonnes	\$'000	hectares	tonnes	tonnes	\$'000
1975-76	332.269	411.481	1.24	43.086	86.716	93.521	1.08	9.313
1976-77	375.504	489.946	1.30	54.318	76.797	63.143	0.82	6.593
1977-78	531.267	705.252	1.33	65.680	82.356	46.013	0.56	3.791
1978-79	544.032	697.685	1.28	62.239	72.316	80.758	1.12	6.902
1979-80	466.582	582.668	1.25	69.013	56.273	48.976	0.87	5.166
1980-81	473.895	468.882	0.99	66.730	60.862	35.137	0.58	4.434

Lupins

The large-scale growing of lupins for processing has been undertaken in Western Australia from about 1971-72, mainly in the areas from Geraldton to Watheroo and from Bridgetown to Kojonup. In later years, with the development of new strains, growing has spread into drier parts of the wheat belt. The industry is based largely on white-seeded, white-flowered varieties of the narrow-leaved lupin (*Lupinus angustifolius*). The main varieties sown in order of popularity are Illyarrie, Unicrop and Yandee, with Marri losing favour with growers in recent years. In 1982 the variety Chittick was released for south-west and south coastal areas. The Ultra variety of the White lupin (*L. albus*) which was released in 1976 for growing on loamy soils, has yet to be proved commercially. Another *L. albus* type, the variety Kiev Mutant, was released in 1982. Severe drought conditions since 1976-77 in the main lupin growing areas have continued to restrict both the area sown and the yield of lupins.

LUPINS FOR GRAIN — AREA AND PRODUCTION

Season	Area	Production		
		Total	Average yield per hectare	Gross value
	hectares	tonnes	tonnes	\$'000
1975-76	121.877	88.710	0.73	7.890
1976-77	95.840	23.323	0.24	2.381
1977-78	57.343	23.616	0.41	2.701
1978-79	39.046	23.789	0.61	3.868
1979-80	46.184	25.192	0.55	3.364
1980-81	55.074	48.201	0.88	8.269

Prior to 1974-75, marketing of lupins was conducted through a voluntary pool operated by The Grain Pool of W.A. In that year the Western Australian Seed Board took over the marketing through a compulsory pool, with the Grain Pool acting as managing and selling agents and Co-operative Bulk Handling Limited acting as licensed receivers. Since November 1975, under the provisions of the *Grain Marketing Act 1975* the Western Australian Seed Board has been disbanded and marketing of lupins (except receival) is now entirely the responsibility of The Grain Pool of W.A.

Other Grains

The introduction of the Wheat Delivery Quotas Plan in 1969-70 effectively limited the quantity of wheat which could be delivered to the Australian Wheat Board. This caused producers to look for alternative cash crops and considerable interest was shown in rape seed production. The area sown to rape expanded rapidly to a peak of 41,566 hectares in 1972-73 but in that season the average yield dropped to 0.21 tonnes per hectare due to the spread of blackleg disease. Consequently the area planted to rape fell dramatically in 1973-74 to 2,225 hectares. Future production will depend on the availability of disease-resistant strains of rape. The first blackleg resistant variety released for sowing was Wesreo in 1978. Wesroona and Wesbell were released in 1980. These high yielding varieties of rape (*Brassica napus*) combine good resistance to blackleg disease with high quality seed. Wesroona has a low glucosinolate level which makes the meal more acceptable for stock feeds.

Low erucic acid rape seed varieties are preferred on local and overseas markets. Currently a maximum of 5 per cent erucic acid is fixed as the acceptable level for receipt into the statutory pool conducted by The Grain Pool of W.A.

RAPE SEED — AREA AND PRODUCTION

Season	Area	Production		
		Total	Average yield per hectare	Gross value
	hectares	tonnes	tonnes	\$'000
1975-76	3,678	1,830	0.50	299
1976-77	949	855	0.90	146
1977-78	1,346	1,474	1.10	294
1978-79	1,952	991	0.51	209
1979-80	3,918	2,275	0.58	505
1980-81	1,235	1,080	0.87	265

The area sown to linseed is small although the yield and quality is sound. Tests carried out have indicated that Western Australian linseed compares favourably with the top North American grades.

Linseed marketing is statutorily controlled and is the responsibility of The Grain Pool of W.A. In recent years only small quantities of linseed have been produced.

Grain sorghum, rye, field peas, vetches and safflower are also grown but only in small quantities. However, considerable interest is being shown in producing sunflower seed in the Ord River region. In 1980-81 1,468 hectares were sown to sunflower in this region, compared to 1,812 hectares in 1979-80. Production of sunflower seeds fell from 2,412 tonnes in 1979-80 to 2,084 tonnes in 1980-81 — this constituted 94 per cent of the recorded production for the State.

Hay

HAY — AREA AND PRODUCTION

Season	Pasture		Oaten		Wheaten		Other (a)		Total	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
	hectares	tonnes	hectares	tonnes	hectares	tonnes	hectares	tonnes	hectares	tonnes
1975-76	80,126	253,012	60,229	212,067	16,803	51,555	6,171	19,843	163,329	536,477
1976-77	74,125	240,893	70,011	247,958	20,129	55,700	5,032	15,880	169,297	560,431
1977-78	82,670	267,254	80,419	258,300	23,452	53,997	4,565	17,043	191,106	596,594
1978-79	77,623	243,974	81,153	270,192	20,976	57,237	4,090	14,416	183,842	585,819
1979-80	92,530	295,240	87,546	270,051	22,839	56,122	4,779	15,012	207,694	636,425
1980-81	106,329	338,489	98,084	287,944	29,214	57,753	6,604	18,561	240,231	702,747

(a) Mainly barley, vetch, lucerne, rye, lupins and rape hay.

Large quantities of pasture hay are cut from clover and grass pastures, production in 1980-81 being 702,669 tonnes from 240,200 hectares. The principal cereal hay crop is oats and

287,944 tonnes of oaten hay were cut in 1980-81 from 98,084 hectares. Wheat is the only other cereal crop which is used extensively for this purpose and in 1980-81 the production was 57,753 tonnes from 29,214 hectares. Barley, vetches, lucerne, rye, lupins and rape are also used for hay making but they are of minor importance only.

Pastures

The first established pastures in the State were cultivated to provide grazing for dairy cattle but, with the rapid increase in the number of sheep carried on wheat farms, by far the greater area is now located in the wheat-growing districts.

Subterranean clover was one of the first pasture species sown in these districts and it is still the most important, although other clovers, medics and a variety of grasses including Wimmera rye grass and perennial rye grasses are also grown extensively. The present practice in the higher-rainfall areas is to sow a mixture of two or more species, selected for their suitability to the type of soil and rainfall, to give a legume-grass pasture.

From 0.8 million hectares in 1945-46, the area under sown pasture increased remarkably to 7.8 million hectares in 1974-75. The top-dressing of pastures with superphosphate has developed to such an extent that this treatment is now general practice.

In the decade from the mid 1960s considerable areas of new land were cleared, much of it along the south coast where the growing season is six or seven months. It has been found that if heavier seed and fertiliser applications are used, good subterranean clover seed crops can be grown in the first year on this new land. Similarly, in more inland districts good yields of annual medics can be obtained on suitable soil types. The paddocks generally being used are large, open and only gently undulating, and are thus suitable for the operation of modern harvesting machines. Very little rain falls in the summer months and this ensures ideal harvesting conditions.

The development of suction harvesting machines in recent years has enabled this potential to be exploited. Suction harvesters are now used to harvest most of the more important small-seeded legume crops (subterranean clover, barrel medic and rose clover).

Seed certification schemes are operated by the Department of Agriculture for the main species of pasture seed. These schemes ensure that buyers are in a position to obtain good quality seed of the cultivar they require free from undesirable weed seeds. Certification schemes have assisted greatly in marketing and in allowing the development of a sound export trade.

PASTURE SEED HARVESTED

Season	Principal pasture seed						Total pasture seed (a)
	Subterranean clover		Lupins		Barrel medic		
	Area harvested	Pro- duction	Area harvested	Pro- duction	Area harvested	Pro- duction	Area harvested
	hectares	kilograms	hectares	kilograms	hectares	kilograms	hectares
1975-76	7.201	1,559,513	2,362	613,508	862	104,298	12,514
1976-77	11.231	2,305,656	n.a.	n.a.	1,009	121,924	(b) 13,603
1977-78	11.046	2,311,822	673	157,460	699	85,180	13,262
1978-79	14.284	2,936,398	596	122,417	2,017	245,802	18,151
1979-80	24,743	4,618,985	1,665	232,216	758	82,450	27,955
1980-81	24,378	4,260,026	2,361	518,772	644	58,100	28,527

(a) Includes lucerne harvested for seed.

(b) Incomplete.

Crops for Green Feed

Large areas of oats are grown for use as green feed for stock. Among other crops which are cultivated for this purpose, but to a far lesser extent, are lupins, barley, wheat, field peas, rye and forage sorghum.

CROPS FOR GREEN FEED — AREA GRAZED OR CUT
(Hectares)

Season	Oats	Lupins	Barley	Wheat	Field peas	Forage sorghum	Rye	Other (a)	Total
1975-76	49,350	n.a.	10,538	5,849	1,727	720	394	1,461	70,039
1976-77	48,286	n.a.	7,551	5,969	1,735	638	541	1,377	66,097
1977-78	55,093	8,815	7,853	6,188	1,717	671	833	1,185	82,355
1978-79	51,927	5,207	7,937	1,647	1,777	1,099	1,320	988	71,902
1979-80	54,814	4,764	10,596	4,613	2,548	970	1,118	809	80,232
1980-81	54,781	4,911	11,908	8,693	2,207	1,017	739	1,844	86,100

(a) Mainly vetches, millet, grain sorghum and maize.

Potatoes

The cultivation of potatoes, the State's principal vegetable crop, is confined largely to the higher-rainfall areas of the south-west. Winter crops are planted during June and early July on the frost-free hillsides and drained flats of the coastal areas between Waroona, Donnybrook and Marybrook and on the market garden land in the Perth Statistical Division. Mid-season plantings are made during August to November on sprinkler-irrigated land in the Manjimup area. Late crops are planted between mid-November and the end of February in all districts growing early or mid-season crops, other than the Perth Statistical Division.

The average yield of potatoes per hectare in Western Australia is consistently greater than that for Australia as a whole, and in 1980-81 comparative yields were 33.49 tonnes and 24.24 tonnes per hectare. This is due mainly to the favourable climatic conditions in Western Australia and the use of sprinkler irrigation. Delaware, the principal variety grown in the State, gives high yields under a wide range of growing conditions. Occasionally there is an exportable surplus, most of which is sent to the Republic of Singapore or to other Australian States.

Potato production in Western Australia is controlled, under the provisions of the *Marketing of Potatoes Act 1946-1974*, by the Western Australian Potato Marketing Board, which is the sole marketing authority for potatoes produced in the State. The object of this provision is to ensure adequate supplies for local consumption and effective marketing of crops.

POTATOES — AREA AND PRODUCTION

Season	Area hectares	Production		
		Total tonnes	Average yield per hectare tonnes	Gross value \$'000
1975-76	2,308	68,033	29.48	12,320
1976-77	2,347	70,943	30.23	11,247
1977-78	2,066	53,289	25.79	9,532
1978-79	2,039	62,572	30.69	12,875
1979-80	2,039	66,184	32.46	14,839
1980-81	1,920	64,308	33.49	16,616

Onions

The production of onions is confined largely to the Spearwood area near Perth and to Manjimup and Pemberton in the south-west. Yields of up to 50 tonnes per hectare are obtained. Over the last decade the area of onions planted has been steadily increasing. The area planted in 1980-81 was a record 232 hectares.

Onions are imported annually into Western Australia during the winter but a surplus is produced locally during summer months and is exported, in the main, to overseas markets, the most important being the Republic of Singapore.

ONIONS — AREA AND PRODUCTION

Season	Area	Production		Gross value
		Total	Average yield per hectare	
	hectares	tonnes	tonnes	\$'000
1975-76	175	7.194	41.11	1.221
1976-77	190	7.863	41.38	1.342
1977-78	189	8.013	42.40	1.529
1978-79	189	8.035	42.51	2.324
1979-80	220	9.404	42.65	2.716
1980-81	232	11.680	50.34	3.265

Tomatoes

The main centres of production of tomatoes are at Carnarvon and Geraldton and in the south-west districts including Perth. At Carnarvon and Geraldton, because of the warm winter climate, growers are able to produce early crops and take advantage of the high prices ruling on the Melbourne market during the winter and spring. They also supply substantial quantities to the Perth market and in 1980-81, the export trade was principally with the Republic of Singapore, Sweden and Brunei.

Supplies to the Perth market from December to June are grown in and near the metropolitan area, principally in the Shire of Wanneroo and in the hills at Jarrahdale. Tomatoes are also grown in a number of districts in the South-West and Lower Great Southern Statistical Divisions.

The total area under tomatoes reached a peak of 629 hectares in 1944-45 but the average yield per hectare in that year was a low 12.02 tonnes per hectare. Since then, although the area has declined, yields per hectare have improved and production in 1980-81 was 7,733 tonnes from 244 hectares, an average yield of 31.70 tonnes per hectare.

TOMATOES — AREA AND PRODUCTION

Season	Area	Production		Gross value
		Total	Average yield per hectare	
	hectares	tonnes	tonnes	\$'000
1975-76	212	7,181.40	33.87	3.284
1976-77	238	8,723.14	36.61	4.053
1977-78	233	7,690.82	33.00	3.852
1978-79	231	7,736.79	33.49	3.629
1979-80	232	8,390.00	36.09	4.269
1980-81	244	7,732.99	31.70	3.331

Other Vegetables

In addition to the cultivation of potatoes, onions and tomatoes, previously mentioned, many other vegetables are produced, the bulk of them in or near the metropolitan area where growers benefit not only from proximity to the principal market but also from an abundant supply of water at relatively shallow depths. Significant quantities of green peas and beans for processing, and cauliflowers, mainly for export, are now being produced in the Shires of Manjimup and Plantagenet, and small quantities of vegetables are produced in other country districts. An important early crop of beans is grown at Carnarvon and transported by road to Perth.

SELECTED OTHER VEGETABLES — AREA, PRODUCTION AND GROSS VALUE

Particulars	Unit	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Beans, French and runner —							
Area	hectare	271	243	242	253	264	282
Production	tonne	1,907	1,714	1,920	2,152	2,437	2,773
Gross value	\$'000	756	755	800	1,349	1,653	2,056
Cabbages —							
Area	hectare	140	149	147	175	146	150
Production	'000 crates	234	265	248	333	283	334
Gross value	\$'000	589	787	822	1,226	964	1,015
Carrots —							
Area	hectare	217	218	247	280	292	313
Production	tonne	8,715	7,930	9,618	10,816	11,405	13,016
Gross value	\$'000	1,247	1,186	2,020	2,271	2,167	2,084
Cauliflowers —							
Area	hectare	301	331	356	440	510	555
Production	'000	3,944	4,002	4,266	5,203	5,864	6,839
Gross value	\$'000	1,600	1,933	2,419	4,060	3,393	4,910
Lettuce —							
Area	hectare	170	176	186	194	193	232
Production	'000 crates	375	378	395	463	439	544
Gross value	\$'000	1,192	1,220	1,900	2,054	2,128	2,022
Peas, green —							
Area	hectare	910	886	868	755	716	640
Production	tonne	4,835	5,825	5,838	4,770	4,786	4,961
Gross value	\$'000	234	319	403	354	417	357

Orchards

FRUIT (a) — AREA AND GROSS VALUE OF PRODUCTION

Season	Area (b)			Gross value of production				
	Orchard fruit	Plantation and berry fruit	Total	Pome (c)	Citrus (d)	Stone (e)	Other (f)	Total
	hectares	hectares	hectares	\$'000	\$'000	\$'000	\$'000	\$'000
1975-76	6,939	212	7,151	13,756	2,018	2,237	2,688	20,699
1976-77	6,903	213	7,115	14,709	2,563	3,081	3,128	23,482
1977-78	6,330	235	6,565	12,769	2,899	3,511	4,680	23,859
1978-79	6,368	269	6,637	18,193	2,554	4,072	6,110	30,930
1979-80	6,412	288	6,700	20,053	2,927	4,173	3,115	30,268
1980-81	6,443	347	6,790	20,436	3,710	3,990	5,523	33,660

(a) Excludes grapes. (b) Comprises bearing and non-bearing trees and plants. (c) Apples, pears and quinces. (d) Principally oranges, mandarins, lemons and grapefruit. (e) Plums, peaches, apricots, nectarines and cherries. (f) Bananas, loquats, figs, olives, passion fruit, almonds and other minor fruits.

Fruit production is largely confined to the temperate regions between Gingin to the north of Perth and Albany on the south coast. The cool, wet winters and warm, dry summers of this area permit the successful cultivation of a wide variety of fruits. In the southern and south-western sections, apples, pears and stone fruits are grown extensively while in the districts around Perth the principal crops are apples, stone fruits, citrus fruits and grapes. Outside this main fruit-growing area, banana plantations have been established at Carnarvon in the north-west.

Apples

Apples, which are the principal fruit crop, account for more than half of the total orchard area. Donnybrook, Manjimup and the hills area near Perth are the most important centres but other districts in the south-west produce large quantities. In 1980-81 the total number of bearing trees was 721,327 which produced 2,692,487 cases, the principal varieties being Granny Smith, Delicious, Jonathan and Yates.

APPLES — NUMBER OF TREES AND PRODUCTION

Season	Number of trees		Production		
	Bearing	Non-bearing	Total	Average yield per bearing tree	Gross value
			cases	cases	\$'000
1975-76	873.058	120.718	2,672.096	3.1	12.594
1976-77	834.200	103.567	2,203.319	2.6	12.323
1977-78	764.094	76.755	1,781.249	2.3	11.443
1978-79	765.409	82.988	2,372.603	3.1	16.464
1979-80	749.029	82.561	2,831.637	3.8	17.968
1980-81	721.327	78.889	2,692.487	3.6	18.335

There is a valuable export trade, with 832,840 cases being exported overseas in 1980-81. The Republic of Singapore is the most important market, followed by Malaysia, the United Kingdom and the Federal Republic of Germany.

Pears

Pears are usually grown in conjunction with apples but the number of trees planted and the quantity produced are much less, the total number of bearing trees in 1980-81 being 70,814 and the production 279,617 cases. The bulk of the crop is consumed locally but significant quantities were exported in 1980-81, principally to the Republic of Singapore and Malaysia.

PEARS — NUMBER OF TREES AND PRODUCTION

Season	Number of trees		Production		
	Bearing	Non-bearing	Total	Average yield per bearing tree	Gross value
			cases	cases	\$'000
1975-76	62.907	26.739	255.757	4.1	1.161
1976-77	61.143	25.775	253.830	4.2	2.202
1977-78	59.226	26.646	237.078	4.0	1.326
1978-79	66.558	22.980	258.974	3.9	1.729
1979-80	70.321	21.009	281.613	4.0	2.085
1980-81	70.814	20.780	279.617	4.0	2.101

Citrus Fruit

While the Shire of Chittering is the chief citrus fruit producer, there are other important areas near Perth in the Shires of Kalamunda and Swan and the Town of Armadale, and in the south-west, in the Shires of Harvey and Capel. Although oranges are by far the most important crop, substantial quantities of lemons and mandarins, and lesser quantities of grapefruit are also produced.

CITRUS FRUIT — NUMBER OF TREES, PRODUCTION AND GROSS VALUE

Particulars	Unit	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Oranges —							
Trees — bearing	No.	258.708	247.674	233.283	217.341	209.558	196.700
non-bearing	No.	25.191	19.283	16.942	13.257	17.702	14.707
Production	cases	374.899	404.901	399.994	288.076	369.556	331.938
Gross value	\$'000	1.281	1.620	2.009	1.612	1.909	2.302
Lemons and limes —							
Trees — bearing	No.	29.506	30.742	33.142	32.580	32.916	32.450
non-bearing	No.	13.222	10.146	7.132	5.936	3.826	2.733
Production	cases	108.622	110.751	117.191	115.097	114.683	112.561
Gross value	\$'000	321	355	385	352	445	441
Mandarins —							
Trees — bearing	No.	36.835	36.621	37.334	37.343	35.648	34.390
non-bearing	No.	10.472	9.849	8.596	7.635	8.007	7.427
Production	cases	51.164	63.543	62.485	61.744	62.502	65.688
Gross value	\$'000	366	488	380	422	427	795
Grapefruit —							
Trees — bearing	No.	9.312	10.095	10.703	10.553	9.377	8.723
non-bearing	No.	6.493	4.427	1.752	1.642	1.469	631
Production	cases	15.598	20.970	19.723	18.917	19.381	18.994
Gross value	\$'000	49	99	108	163	146	161

Production is largely for local consumption but there is some export trade especially in lemons. In 1980-81 the most important buyers were the Republic of Singapore, Malaysia, Christmas Island and Hong Kong.

Stone Fruits

Plums, peaches, apricots, nectarines and cherries are grown in the hills districts in the Darling Range near Perth, in the Swan Valley and in many districts in the south-west. The total number of bearing stone fruit trees in 1980-81 was 145,911, comprising 63,722 plum and prune trees, 55,077 peach trees, 11,199 apricot trees, 11,551 nectarine trees and 4,362 cherry trees. The bulk of the stone fruit crop is consumed locally but shipments are sent overseas. Plums are the most important stone fruit exported overseas, and in 1980-81 the main markets were the Republic of Singapore, Malaysia and Hong Kong.

STONE FRUIT — NUMBER OF TREES, PRODUCTION AND GROSS VALUE

Particulars	Unit	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Apricots —							
Trees — bearing	No.	11,775	12,106	11,053	11,420	11,381	11,199
non-bearing	No.	3,863	2,868	3,174	4,798	6,083	7,146
Production	cases	17,903	23,095	19,138	21,338	26,051	23,435
Gross value	\$'000	255	306	360	348	283	294
Nectarines —							
Trees — bearing	No.	6,785	7,413	7,727	8,769	10,331	11,551
non-bearing	No.	3,020	3,124	4,370	4,931	4,867	10,584
Production	cases	12,323	14,090	13,773	18,189	24,547	26,149
Gross value	\$'000	113	186	182	215	299	289
Peaches —							
Trees — bearing	No.	46,516	46,783	46,048	51,224	54,501	55,077
non-bearing	No.	14,095	14,574	15,096	19,037	20,829	29,925
Production	cases	102,246	102,328	90,893	127,804	141,093	140,949
Gross value	\$'000	621	911	1,023	1,404	1,432	973
Plums and prunes —							
Trees — bearing	No.	63,651	65,082	62,818	63,872	65,658	63,722
non-bearing	No.	9,754	9,927	10,854	12,798	15,933	19,296
Production	cases	144,187	147,840	137,086	154,197	152,116	149,417
Gross Value	\$'000	1,167	1,460	1,782	1,958	2,092	2,089

Bananas

Production of bananas is confined almost entirely to a narrow strip of land along the Gascoyne River at Carnarvon. The plantations are dependent on water pumped from bores which tap a subterranean flow in the sands of the usually dry river bed. As a surface flow in the river channel results only from heavy rains, which do not occur every year, a problem is presented in the falling-off of water supplies and in the increase in the salt content of the underground water during long dry periods. These conditions and also periodic damage from cyclones cause fluctuations in the area of the plantations and in production.

The crop is transported by road to Perth and sold locally in competition with bananas imported from other Australian States.

BANANAS — AREA AND PRODUCTION

Season	Area		Production		
	Plants of bearing age	Young plants not bearing	Total	Average yield per hectare (a)	Gross value
	hectares	hectares	tonnes	tonnes	\$'000
1975-76	150	27	5,271.70	35.14	2,205
1976-77	162	20	5,560.77	34.33	2,502
1977-78	166	37	5,408.78	32.58	4,057
1978-79	186	53	6,232.90	33.51	5,049
1979-80	194	62	3,334.48	17.22	2,101
1980-81	240	66	7,684.21	31.96	4,380

(a) Calculated on the area of bearing plants only.

Vineyards

Approximately 50 per cent of the State's 2,446 hectares of grape vines are in the Shire of Swan, other historically important centres being Chittering, Wanneroo, Toodyay and Gosnells. In recent years significant areas of vines have been planted at Gingin, Margaret River, Mount Barker and Frankland River and wines produced have shown considerable promise, winning major awards around Australia.

In the dried vine fruit industry, currants are the main item of production and a high proportion of the crop is exported. In 1980-81, all exports went to other Australian States.

Table grapes are grown for the local market and for export overseas, mainly to Indonesia and the Republic of Singapore. The production of beverage wines reached a record of over 4.7 million litres in 1980-81. Most of the wine produced is for local consumption although approximately 450,000 litres was exported to other Australian States and overseas in 1980-81.

GRAPES — AREA AND PRODUCTION

Season	Area		Grapes used for wine making and table use		Dried vine fruits		Wine production	
	Vines of bearing age	Young vines not bearing	Quantity	Gross value	Quantity	Gross value	Beverage (a)	Distillation
	hectares	hectares						
1975-76	2,010	364	7,257	1,318	1,068	681	3,198,158	879,270
1976-77	2,048	397	7,419	1,685	876	560	3,729,330	543,175
1977-78	2,200	340	7,431	1,655	916	594	3,158,007	540,885
1978-79	2,269	291	8,174	2,755	820	607	3,507,509	638,138
1979-80	2,324	229	8,850	2,634	889	802	4,059,711	414,496
1980-81	2,212	234	8,832	2,517	529	529	4,707,168	24,171

(a) Includes spirit produced from distillation wine and used in fortification.

Nurseries

The main concentration of commercial nurseries is in the areas of Wanneroo, Kalamunda and Canning Vale in the Perth Statistical Division. Most nurseries produce ornamental shrubs and trees; some specialise in the production of bedding plants while others concentrate on cut-flower production. Fruit trees, mainly citrus, are produced by specialist nurseries in the Perth Statistical Division while pome and stone fruit trees are mostly produced in the South-West Statistical Division at Manjimup and Donnybrook.

NURSERIES (a) — AREA AND GROSS VALUE (b)

Particulars		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Area	hectares	136	153	191	236	240	280
Gross value (c)	\$'000	4,682	5,939	7,868	10,475	(d) 10,807	12,048

(a) Excludes non-commercial nurseries and commercial nurseries with total sales of nursery products less than \$1,500 until 1979-80 and those with less than \$2,500 in subsequent years. (b) Value at the holding, after deducting costs incurred in marketing. (c) Sales between nurseries included in the census have been excluded. (d) Estimated.

Artificial Fertiliser

Soils in Western Australia are acutely deficient in phosphate, and regular applications of phosphatic fertiliser are required for crop and pasture growth. Newly cleared land may require applications of up to 230 kilograms of superphosphate per hectare for satisfactory crop yields, but annual applications can be reduced as the phosphate content of the soil is improved through the residual effect of the added fertiliser. On established land, applications of 100 kilograms to 120 kilograms of superphosphate per hectare are commonly used in wheat growing.

Nitrogen deficiencies also exist in some areas. Legume pastures have assisted greatly in building up nitrogen in the soil and in some situations appreciable increases in yield may be achieved by applying forms of concentrated nitrogenous fertiliser.

ARTIFICIAL FERTILISER USED ON RURAL HOLDINGS

Season	Crops					Pastures (a)				
	Area fertilised	Quantity used			Average per hectare	Area fertilised	Quantity used			Average per hectare
		Super-phosphate (b)	Other artificial fertilisers	Total			Super-phosphate (b)	Other artificial fertilisers	Total	
	hectares	tonnes	tonnes	tonnes	tonnes	hectares	tonnes	tonnes	tonnes	tonnes
1975-76	3,764,930	402,767	121,100	523,867	0.14	4,013,972	444,914	21,078	465,992	0.12
1976-77	4,091,336	409,138	148,623	557,760	0.14	4,224,585	450,420	24,383	474,803	0.11
1977-78	4,573,468	367,102	212,351	579,454	0.13	4,357,208	480,496	37,784	518,280	0.12
1978-79	4,713,656	346,628	219,196	565,823	0.12	4,083,188	456,959	41,322	498,281	0.12
1979-80	n.a.	360,804	230,958	591,762	n.a.	4,830,858	554,682	52,603	607,285	0.13
1980-81	n.a.	408,896	213,108	622,004	n.a.	4,790,957	555,522	48,759	604,281	0.13

(a) Includes lucerne for all purposes.

(b) Includes superphosphate with trace elements.

PASTORAL PRODUCTION

Throughout this section, where mention is made of the 'pastoral areas' the portion of the State referred to comprises the Kimberley and Pilbara Statistical Divisions and the Sub-divisions of Lefroy, Gascoyne and Carnegie. The balance of the State, referred to as the 'agricultural areas', comprises the Perth, South-West, Upper Great Southern, Lower Great Southern and Midlands Statistical Divisions and the Sub-divisions of Dundas and Greenough.

In the early days of settlement, pastoral activities in Western Australia were confined largely to what are now the agricultural areas and were usually associated with the cultivation of crops. However, beginning with Captain George Grey's visit in 1838 to the area known as the West Kimberley, explorers increasingly drew attention to the pastoral possibilities of large sections of the present Kimberley, Pilbara and Central Statistical Divisions.

In 1857 and 1858, F. T. Gregory noted the existence of good pastoral country in the Murchison and the Gascoyne districts and in the course of a journey further to the north in 1861 he discovered the Ashburton, Fortescue, De Grey and Oakover Rivers. His reports of good grazing lands in the area led to the establishment of sheep stations by pastoralists from the south, the first of such ventures in 1863, being in the De Grey district of what is now the Pilbara Statistical Division. Graziers were also turning their attention to the south-east and in the 1870s pastoral lands were being taken up in the coastal areas to the south of the Nullarbor Plain. Another development in the extension of pastoral activity began with Alexander Forrest's journey through the Kimberley in 1879 and his favourable reports on the suitability of the country for grazing. Leases along the Fitzroy and the Ord Rivers were stocked not only with livestock shipped from the south and from the other Australian Colonies but also with cattle brought overland to the area, principally from Queensland and New South Wales, by remarkable feats of droving.

The value of production from the pastoral areas for 1980-81 was 3.2 per cent of the total gross value of Western Australian agricultural production.

Sheep

The following table shows the total numbers of sheep and their distribution between the agricultural and pastoral areas, in each year from 1961 to 1981. Additional details showing the numbers of sheep in the State appear in the Statistical Summary following Chapter X.

SHEEP NUMBERS AND DISTRIBUTION

At 31 March —	In agricultural areas		In pastoral areas		State total
	Number	Proportion of State total (per cent)	Number	Proportion of State total (per cent)	
1961	13,940,614	81.3	3,210,770	18.7	17,151,384
1962	14,951,185	81.6	3,362,694	18.4	18,313,879
1963	15,403,902	82.3	3,323,222	17.7	18,727,124
1964	16,608,300	82.4	3,556,568	17.6	20,164,868
1965	18,670,759	83.4	3,721,075	16.6	22,391,834
1966	20,695,040	84.7	3,731,768	15.3	24,426,808
1967	23,525,280	86.0	3,845,106	14.0	27,370,386
1968	26,406,575	87.6	3,754,302	12.4	30,160,877
1969	28,888,450	87.8	4,012,708	12.2	32,901,158
1970	29,844,044	88.7	3,789,913	11.3	33,633,957
1971	31,129,804	89.7	3,579,044	10.3	34,708,848
1972	31,049,873	90.2	3,355,125	9.8	34,404,998
1973	27,777,077	89.8	3,142,103	10.2	30,919,180
1974	29,423,820	90.7	3,027,253	9.3	32,451,073
1975	31,472,640	91.3	3,003,697	8.7	34,476,337
1976	31,577,937	90.8	3,192,785	9.2	34,770,722
1977	28,206,722	90.5	2,951,591	9.5	31,158,313
1978	27,621,890	92.6	2,201,226	7.4	29,823,116
1979	28,250,354	93.3	2,014,364	6.7	30,264,718
1980	28,729,643	94.4	1,701,319	5.6	30,430,962
1981	29,001,627	94.3	1,762,057	5.7	30,763,684

The present distribution of sheep in the State is the result of two opposite trends operating over many years. In the pastoral, or station areas where the industry is based on long-term pastoral leases, overuse of the vegetation resource base, severe droughts and reduced profitability have led to a decline in the number of sheep. In the agricultural, or farming areas, however, the sheep population has generally risen. Factors contributing to this rise have been the increasing use of subterranean clover in the wheat belt, the provision in many areas of more assured water supplies, a taxation policy which, by the provision of special concessions to primary producers, has encouraged farmers to clear and develop new land, the War Service Land Settlement Scheme which developed new areas and the stimulating effect of buoyant wool prices in the post-war period.

The result has been a marked upward trend in sheep numbers particularly during the 1960s. Sheep numbers reached a peak of 34.8 million at 31 March 1976 but declined to 29.8 million at 31 March 1978 mainly as a result of the poor seasonal conditions and the continuing decline in pastoral areas. Numbers in the agricultural areas increased from 7 million or 72 per cent of the State total in 1945, to 29.0 million or over 94 per cent at 31 March 1981. Numbers generally increased in pastoral areas after 1945 until they reached more than 4 million in 1969. Since then numbers have declined to 1.8 million in 1980-81 and as a percentage of the State total this represents a decline from 28 per cent in 1945 to just under 6 per cent in 1980-81.

In the following table, sheep flocks at 31 March 1981 are classified according to the size of the flock. Of the 18,165 establishments of all types, sheep were carried on 11,825. Establishments carrying between 1,000 and 3,999 sheep accounted for 52 per cent of the flocks and 45 per cent of the total number of sheep. Those with less than 1,000 sheep accounted for 29 per cent and 5 per cent, respectively, and those with more than 3,999 accounted for 19 per cent and 50 per cent, respectively.

An analysis of collected data relating to breeds of sheep as at 31 March 1981 showed that Merinos accounted for 93 per cent of the total. Corriedales, Polwarths and British breeds, the most important of which are Border Leicester, Dorset Horn, Poll Dorset, Southdown and Suffolk, comprised 4 per cent and 3 per cent was made up of Crossbreds, including Merino Comebacks.

SHEEP FLOCKS AT 31 MARCH 1981
CLASSIFIED ACCORDING TO SIZE OF FLOCK

Size of flock (numbers)	Number of —	
	Flocks	Sheep
1 — 99	781	30,196
100 — 499	1,202	344,414
500 — 999	1,419	1,053,132
1,000 — 1,499	1,510	1,867,285
1,500 — 1,999	1,254	2,173,126
2,000 — 2,999	2,040	5,008,573
3,000 — 3,999	1,364	4,694,137
4,000 — 4,999	751	3,341,746
5,000 — 5,999	494	2,686,511
6,000 — 6,999	302	1,950,455
7,000 — 7,999	211	1,568,371
8,000 — 8,999	144	1,215,598
9,000 — 9,999	79	751,276
10,000 — 14,999	189	2,259,803
15,000 — 19,999	53	914,155
20,000 — 49,999	30	744,478
50,000 and over	2	160,428
Total	11,825	30,763,684

Marketing of Lamb

Lamb Marketing Board. All lamb produced for slaughter south of the twenty-sixth parallel in Western Australia is marketed through the Western Australian Lamb Marketing Board. The Board was established by the *Marketing of Lamb Act 1971* and began operations in December 1972. It came into being mainly as a result of pressure from, and following a referendum of the State's lamb producers who looked to the Board to improve the stability of their industry and increase returns.

As provided by the Act, the Lamb Marketing Board consists of five members, four of whom are appointed by the Governor and an *ex officio* member, the manager of the Board, who is its chief executive officer. Of the appointed members, two are elected producer representatives, and two are nominated by the Minister for Agriculture; one of these is a meat trade representative and the other who is neither a producer nor financially interested in the slaughter, distribution or sale of lamb shall be Chairman of the Board. The major aims of the Board are to administer an orderly method of marketing and encourage producer participation in lamb marketing, operate an advance price schedule, and a weight and grade system and rationalise procedures throughout the industry.

Apart from control of the local market supplies the Board also is responsible for arranging exports of lamb. During the period of the Board's operations there has been a marked change in the pattern of export sales of Western Australian lamb with the traditional United Kingdom market being replaced by other markets.

The Board now operates a factory for the processing and packing of offal and primal cuts giving diversification, with greater marketing potential, for quality products.

Wool

Total wool production in 1980-81 amounted to 163,636 tonnes, of which shorn wool accounted for 159,317 tonnes. It was shorn from 36.5 million sheep and lambs, the average weight of wool shorn being 4.4 kilograms. The balance of the 1980-81 production comprised 1,210 tonnes of dead and fellmongered wool, and 3,109 tonnes of wool exported on skins.

During the war years wool was compulsorily acquired by the Commonwealth Government in accordance with an agreement with the United Kingdom. Government control ceased after the war and the auction system was reintroduced. Since then, there has been a range of legislative action taken with the aim of promoting the use of wool and wool products, encouraging efficient marketing and providing a steadying influence on market prices. A

summary of this government action is contained on page 386 of the *Western Australian Year Book*, No. 20 — 1982.

A major development in the administration of the wool industry was the passing of the *Wool Industry Act 1972*, which brought into existence the Australian Wool Corporation on 1 January 1973. The functions of the Corporation relate to wool marketing, wool use promotion, wool research and the management of wool stores. The Commonwealth Government decided, in May 1981, that the Australian Wool Testing Authority (whose functions include wool testing) was to be re-constituted as an entity legally separated from the Corporation.

Sale by sample and test certificate is now used for 94 per cent of the woolclip sold by auction or tender. This system has enabled sale by separation, where wool is stored in one centre and sold in another. Wool selling centres with infrequent sales use this method to reduce delays in payment to growers.

Following amendments to the *Wool Industry Act* in 1977 the Corporation now has an active role in negotiating sea freights for wool to Australia's main markets.

The number of sheep and lambs shorn, the average weight of wool shorn per sheep or lamb, and production of wool are given in the following table.

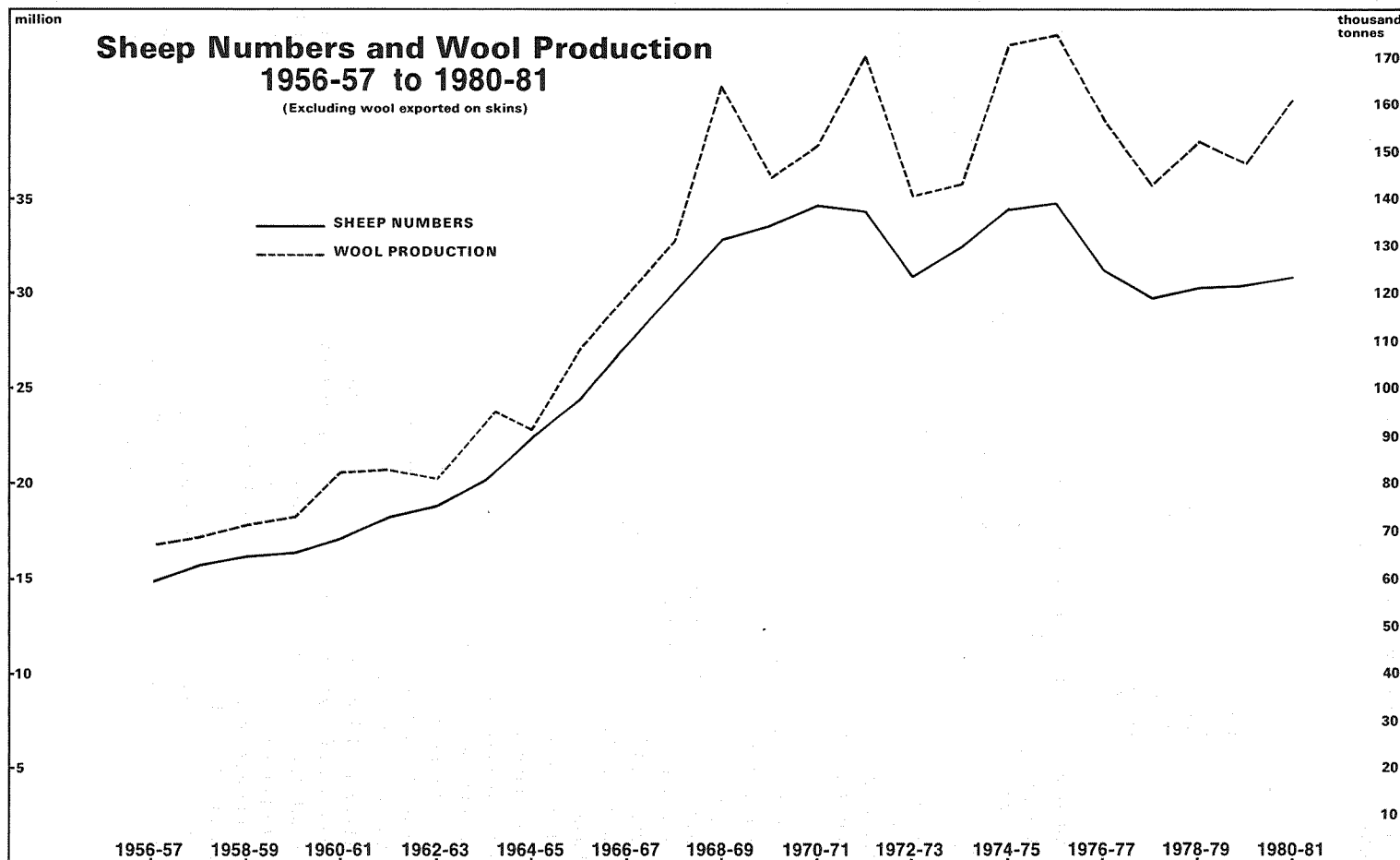
SHEEP SHORN AND WOOL PRODUCTION YEAR ENDED 30 JUNE

Year	Sheep shorn			Average weight of wool shorn	Wool production (in the grease)			
	Sheep	Lambs	Total		Shorn	Dead and fell-mongered	Exported on skins	Total
	'000	'000	'000	kg	tonnes	tonnes	tonnes	tonnes
1975-76	31.363	7.526	38.889	4.5	173.987	820	8.815	183.622
1976-77	29.175	6.114	35.289	4.4	154.919	1.318	10.138	166.375
1977-78	28.293	5.580	33.873	4.2	141.929	1.198	6.275	149.402
1978-79	27.321	6.534	33.855	4.4	148.960	1.324	4.858	155.142
1979-80	27.804	7.091	34.895	4.2	146.559	1.281	3.489	151.329
1980-81	28.867	7.674	36.541	4.4	159.317	780	3.555	163.652

The number of sheep and lambs shorn, wool clip and average weight of wool shorn in each statistical division for the season 1980-81 are given in the following table.

SHEEP AND LAMBS SHORN AND WOOL CLIP IN STATISTICAL DIVISIONS YEAR ENDED 31 MARCH 1981

Statistical division	Sheep and lambs shorn	Wool clip	Average weight of wool shorn		
			Sheep	Lambs	Total
	number	kg	kg	kg	kg
Perth Statistical Division	338.559	997.183	3.0	1.6	2.9
Other divisions —					
South-West	1,795.125	7,490.382	4.8	1.6	4.2
Lower Great Southern	9,326.339	42,880.606	5.4	1.6	4.6
Upper Great Southern	8,043.782	35,554.615	5.2	1.5	4.4
Midlands	9,205.430	37,894.970	4.9	1.5	4.1
South-Eastern	3,039.719	13,909.714	5.3	1.9	4.6
Central	3,968.004	17,128.654	5.0	1.5	4.3
Pilbara	349.724	1,378.953	4.2	1.7	3.9
Kimberley	255	526	2.2	1.2	2.1
Total	35,728.378	156,238.420	5.1	1.6	4.4
WESTERN AUSTRALIA	36,066.937	157,235.603	5.1	1.6	4.4



The next table shows the gross value of wool production for the six years 1975-76 to 1980-81.

GROSS VALUE OF WOOL PRODUCTION
(\$'000)

Year	Shorn wool	Dead wool and fellmongered wool	Wool exported on skins	Total
1975-76	241.477	550	9.408	251.434
1976-77	274.469	1.146	15.743	291.358
1977-78	256.794	1.240	11.744	269.778
1978-79	285.079	1.521	6.169	292.769
1979-80	346.612	1.602	9.061	357.275
1980-81	399.806	1.383	9.427	410.615

Although the greater proportion of the wool clip is exported in the grease, scouring or degreasing is done in the State and degreased wool is an appreciable item in the external wool trade. During 1980-81 exports of greasy and degreased wool were 115,542 tonnes and 19,935 tonnes, respectively. The most important buyers of greasy wool were Japan, the Union of Soviet Socialist Republics, the Federal Republic of Germany, Italy, France, the Republic of Korea, Belgium-Luxembourg and China, Taiwan Province only. Principal purchasers of degreased wool were Japan, Italy, the United States of America, the Federal Republic of Germany and the United Kingdom. Further details of exports of greasy and degreased wool, both interstate and overseas, are given in Chapter IX, Part 1 — *External Trade*.

Cattle

Cattle are classified according to the two main purposes of 'meat production' and 'milk production', irrespective of breed.

The table below shows the numbers of cattle for meat production kept on agricultural establishments at 31 March 1976 to 1981. A later table details, for the same period, the numbers kept for milk production. Cattle numbers in each State and Territory at 31 March 1981 are given in a table later in this Part.

In 1981 the Kimberley Statistical Division carried 767,105 head of cattle for meat production, or 37.8 per cent of the State total. Other pastoral areas carried 168,432 head and agricultural areas 970,892.

The cattle which were originally shipped or driven overland from the other Australian Colonies to start the industry in the northern pastoral areas were predominantly shorthorn breeds, and these still form the great bulk of all cattle kept for meat production in those areas. Carcass weights, however, have been increased by importing better-type bulls, by improving watering facilities on the cattle stations and by the replacement of droving with the transport of the animals from stations to abattoirs in large road trucks.

There are killing and freezing works at the ports of Wyndham, Broome and Derby and consignments of frozen beef from these centres go mainly to overseas destinations. Some of it is sent south for consumption in the metropolitan area and live cattle are also shipped from northern ports to overseas markets. However, by far the greater proportion of beef consumed in the southern part of the State is supplied from the agricultural areas, some of it being from stock culled from dairy herds.

The following table shows the numbers and proportions of cattle for meat production in agricultural areas and in pastoral areas at 31 March 1976 to 1981. At 31 March 1966, the proportion of cattle kept for meat production in agricultural areas was only 42.5 per cent, with 451,062 cattle out of a total of 1,061,767. The importance of the agricultural areas as a source of meat production increased steadily until 1975 when 63.7 per cent of cattle kept for meat production were in these areas. However, since 1975 this proportion has decreased to 50.9 per cent at 31 March 1981.

CATTLE FOR MEAT PRODUCTION — NUMBERS AND DISTRIBUTION

Particulars	At 31 March —					
	1976	1977	1978	1979	1980	1981
Number of head —						
In agricultural areas	1,547,908	1,325,113	1,165,974	1,016,661	985,652	970,892
In pastoral areas	939,065	987,397	971,264	947,487	951,907	935,537
Total	2,486,973	2,312,510	2,137,238	1,964,148	1,937,559	1,906,429
	per cent	per cent	per cent	per cent	per cent	per cent
Proportion of total —						
In agricultural areas	62.2	57.3	54.6	51.8	50.9	50.9
In pastoral areas	37.8	42.7	45.4	48.2	49.1	49.1

CATTLE FOR MEAT PRODUCTION AT 31 MARCH 1981
CLASSIFIED ACCORDING TO SIZE OF HERD AND LOCATION

Size of herd (numbers)	In agricultural areas		In pastoral areas		Whole State	
	Number of —		Number of —		Number of —	
	Herds	Cattle	Herds	Cattle	Herds	Cattle
1 — 29	1,981	23,372	30	383	2,011	23,755
30 — 49	907	35,614	14	537	921	36,151
50 — 69	697	41,010	14	806	711	41,816
70 — 99	823	68,496	10	794	833	69,290
100 — 149	886	108,411	14	1,658	900	110,069
150 — 199	552	94,988	5	802	557	95,790
200 — 299	611	148,636	27	6,219	638	154,855
300 — 399	271	93,084	24	8,402	295	101,486
400 — 499	152	67,451	8	3,530	160	70,981
500 — 699	160	92,711	17	10,034	177	102,745
700 — 999	73	59,601	15	13,004	88	72,605
1,000 — 1,499	39	46,765	18	20,770	57	67,535
1,500 — 1,999	13	21,627	17	29,503	30	51,130
2,000 — 4,999	16	46,854	38	118,348	54	165,202
5,000 — 9,999	—	—	24	171,806	24	171,806
10,000 and over	2	22,272	35	548,941	37	571,213
Total	7,183	970,892	310	935,537	7,493	1,906,429

Slaughtering

Beef from cattle slaughtered at Wyndham, Broome and Derby in the Kimberley Division is principally for export. The local market for meat is supplied mainly from abattoirs at Fremantle, Waroona, Harvey, Bunbury, Albany, Wooroloo and Katanning. Most of these establishments also slaughter for the export trade. Small establishments operating in country towns also contribute substantially to total production, and most stations and many farms slaughter sufficient for all or part of their own requirements.

LIVESTOCK SLAUGHTERED AND MEAT PRODUCED

Year	Livestock slaughtered (a)				Meat produced (b)			
	Sheep		Lambs		Cattle and calves		Mutton and lamb	Beef and veal
	Number	Gross value (c)	Number	Gross value (c)	Number	Gross value (c)		
	'000	\$'000	'000	\$'000	'000	\$'000	tonnes	tonnes
1975-76	4,394	19,183	1,745	13,573	793	45,803	103,303	147,223
1976-77	4,193	30,885	1,833	18,094	918	65,062	93,762	160,287
1977-78	2,668	31,329	1,487	20,512	848	76,931	65,483	148,149
1978-79	2,454	30,575	1,384	19,313	749	101,398	63,272	136,141
1979-80	2,917	47,251	1,556	24,561	613	149,165	73,706	116,199
1980-81	2,969	64,832	1,556	32,014	663	177,382	75,591	126,578

(a) Mainly slaughterings for human consumption but also includes quantities condemned and small numbers of livestock slaughtered for boiling down. (b) Dressed carcass weight; excludes condemned carcasses and offal. (c) Value 'on hoof' at principal market.

DAIRYING

Compared with the wheat, wool and meat producing industries, dairying as a major well-organised rural activity is of fairly recent origin. Its growth was retarded initially by the difficulty of clearing heavily-timbered country in the south-west and the need for special methods of pasture establishment, but these problems were progressively overcome and dairying became a significant feature of primary production. In recent years dairy production has been increasingly affected by a cost/price squeeze and loss of traditional markets.

The following table shows the numbers of cattle kept for milk production on agricultural establishments at 31 March 1976 to 1981. From a total of 240,338 at 31 March 1963 the numbers have declined to 126,181 at 31 March 1981.

CATTLE FOR MILK PRODUCTION

Particulars	At 31 March —					
	1976	1977	1978	1979	1980	1981
	number	number	number	number	number	number
Bulls of dairy breeds used or intended for service —						
Aged one year and over	2,409	2,239	1,802	1,328	1,285	1,257
Calves (aged under one year)	1,078	1,199	1,111	456	435	490
Total	3,487	3,438	2,913	1,784	1,720	1,747
Cattle used or intended for production of —						
Milk or cream for sale —						
Cows — In milk and dry	93,188	83,518	74,107	72,298	71,541	70,734
Heifers — Aged one year and over	35,747	33,264	29,473	26,824	27,671	28,574
Heifer calves — Aged under one year	29,188	26,111	22,395	22,842	22,683	21,253
Milk or cream for use on agricultural establishments —						
House cows and heifers	5,916	5,590	5,221	4,239	3,942	3,873
Total	164,039	148,483	131,196	126,203	125,837	124,434
Total cattle for milk production	167,526	151,921	134,109	127,987	127,557	126,181

A summary of the history of the dairying industry in Western Australia, with specific reference to legislative and marketing arrangements, price instability and subsidy schemes, is contained on pages 391-2 of the *Western Australian Year Book*, No. 20 — 1982.

After investigation into the state of the dairy industry and the type of assistance which should be provided, the Industries Assistance Commission made certain recommendations in its report of September 1976. The recommendations were for a three-tiered compulsory stabilisation scheme to be operated by the Australian Dairy Corporation.

The *Dairy Industry Stabilization Act 1977* and related legislation provided for the implementation of Stage I, essentially a compulsory levy-disbursement scheme, from 1 July 1977. This replaced the previous voluntary equalisation scheme administered by the Commonwealth Dairy Produce Equalisation Committee Ltd and is expected to have results similar to those attained under the voluntary scheme.

The Commonwealth Dairy Produce Equalisation Committee Ltd continued in existence until 30 June 1978, having at that date finalised all equalisations of product pools for which it had been responsible.

Stages II and III of the compulsory scheme have not been introduced owing to reduced milk production and much lower exportable surpluses.

Previous underwriting arrangements, recommended by the Industries Assistance Commission to be maintained on a short term basis, were continued by the Commonwealth Government until new underwriting arrangements were introduced in June 1981. Under these arrangements the underwritten prices are determined as 95 per cent of the three years moving average of gross equalised pool returns.

The level of underwriting applicable to the production period commencing 1 July 1981 enabled manufacturers to pay their suppliers an initial payment of \$2.89 per kilogram butterfat at place of production. This sum is made up of \$2.60 of pool proceeds subject to underwriting cover and 29 cents per kilogram initial support from the Dairy Industry Authority for purposes of stabilising payments to suppliers made by manufacturers with respect to periodic increases in disbursements made from the Dairy Products Stabilisation Trust Fund.

In the next table, the number of establishments carrying cattle for milk production at 31 March 1981 are classified by the size of the herds. Herds of less than ten cattle for milk production accounted for 70 per cent of herds but only 3 per cent of the total number of such cattle. Establishments carrying 100 or more cattle for milk production accounted for only 23 per cent of herds but 91 per cent of the total cattle for milk production at that date.

CATTLE FOR MILK PRODUCTION AT 31 MARCH 1981
CLASSIFIED ACCORDING TO SIZE OF HERD

Size of herd (numbers)	Number of herds	Total cattle
1 — 9	1,606	3,869
10 — 19	38	494
20 — 29	17	405
30 — 39	17	563
40 — 49	13	578
50 — 59	14	745
60 — 69	12	780
70 — 79	11	817
80 — 89	12	1,024
90 — 99	26	2,479
100 — 124	69	7,851
125 — 149	70	9,592
150 — 174	74	11,959
175 — 199	71	13,214
200 — 249	113	24,877
250 and over	138	46,934
Total	2,301	126,181

The quantity and gross value of whole milk produced in each of the years 1975-76 to 1980-81 are given in the following table.

WHOLE MILK PRODUCTION (a)

Particulars		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Quantity	'000 litres	232.265	214.851	212.228	212.918	216.477	214.000
Gross value (b)	\$'000	20.660	23.274	29.925	36.549	41.865	52.692

(a) Year ended 30 June. Includes milk used for processing into butter, cheese and condensery products. Details of butter production appear in Part 3 of this Chapter. (b) Includes subsidy paid by the Commonwealth Government.

PIG RAISING

The principal pig raising districts are the Upper Great Southern, Lower Great Southern, South-West and Midlands Statistical Divisions. At 31 March 1981, 77 per cent of pigs were within these divisions.

The principal breeds in Western Australia are the Large White and Landrace. Berkshires, once a major breed, are now mainly used for crossbreeding to produce hardy sows for difficult conditions. Pigs are reared for bacon and ham as well as pork and may be sold for slaughter at Midland saleyard or a number of country auctions. Alternatively, major processors offer an advance price schedule based on a weight and grade system. Although the greater proportion of production is consumed locally, there is some export trade. In 1980-81 144,287 kilograms of pork was shipped overseas.

In the following table, pig herds at 31 March 1981 are classified according to the size of the herd. Establishments carrying less than fifty pigs accounted for 49 per cent of the total herds but only 9 per cent of the total number of pigs. Herds containing between fifty and 499 pigs

accounted for 48 per cent of herds and 53 per cent of total pigs while those with more than 500 pigs accounted for only 4 per cent of herds but almost 38 per cent of pigs.

**PIG HERDS AT 31 MARCH 1981
CLASSIFIED ACCORDING TO SIZE OF HERD**

Size of herd (numbers)	Number of of herds	Total pigs
1 — 9	288	1.400
10 — 19	265	3.784
20 — 29	199	4.779
30 — 39	216	7.400
40 — 49	167	7.460
50 — 69	270	15.892
70 — 99	264	21.941
100 — 149	228	27.724
150 — 199	135	23.212
200 — 299	109	26.235
300 — 499	104	39.237
500 — 699	30	17.494
700 — 999	31	24.905
1,000 and over	26	67.932
Total	2,332	289,395

In the table below, the numbers of pigs on agricultural establishments at 31 March are shown for each of the years 1976 to 1981. The number of pigs reported at 31 March 1979 showed the first increase since 1973.

PIG NUMBERS

At 31 March —	Boars	Breeding sows	Other pigs	Total
1976	4,093	37,260	218,498	259,851
1977	3,921	35,396	202,799	242,116
1978	3,881	35,780	197,697	237,358
1979	4,013	40,493	226,984	271,490
1980	4,431	43,892	244,595	292,918
1981	3,706	44,102	241,587	289,395

The next table shows the numbers and gross value of pigs slaughtered in each of the years 1975-76 to 1980-81, together with the quantity of meat produced. Factory production of bacon and ham is also shown.

PIGS SLAUGHTERED (a) AND MEAT PRODUCED

Year	Pigs slaughtered		Pigmeat produced (c)	Bacon and ham produced (d)
	Number	Gross value (b)		
		\$'000	tonnes	tonnes
1975-76	354,204	18,211	19,832	5,368
1976-77	345,175	18,348	19,671	5,873
1977-78	322,781	18,994	18,170	5,625
1978-79	328,561	21,500	17,973	5,604
1979-80	381,300	27,205	21,285	5,930
1980-81	426,812	35,944	24,116	6,062

(a) Comprises slaughterings in abattoirs, butcheries and on stations and farms. (b) Value 'on hoof' at principal market or at factory door. (c) Dressed carcass weight: excludes condemned carcasses and offal but includes quantities used to produce bacon and ham. (d) Factory production.

LIVESTOCK IN AUSTRALIA

The following table gives details of livestock numbers in each State and Territory of Australia at 31 March 1981.

LIVESTOCK NUMBERS AT 31 MARCH 1981 — AUSTRALIA
(‘000)

State or Territory	Sheep	Cattle			Total	Pigs
		Bulls (1 year and over) used or intended for service	For production of milk or cream	Mainly for meat production		
New South Wales	46,000	103	455	4,901	5,459	787
Victoria	25,487	87	1,512	2,714	4,313	400
Queensland	10,620	174	359	9,392	9,925	502
South Australia	17,056	25	157	909	1,091	394
Western Australia	30,764	40	125	1,867	2,033	289
Tasmania	4,380	11	147	500	658	54
Northern Territory	1	37	—	1,638	1,675	3
Australian Capital Territory	99	—	—	12	13	—
AUSTRALIA	134,407	478	2,756	21,933	25,168	2,430

POULTRY FARMING

Poultry farming in Western Australia is now a specialised industry located almost entirely within the Perth Statistical Division. A few commercial egg farms are established in the more populous country areas.

Almost all the egg production and a large proportion of the chicken meat production is on holdings which specialise in the production of either poultry meat or eggs. A few laying birds are kept for commercial production on orchards, dairy farms and wheat farms throughout the agricultural areas.

The Western Australian Egg Marketing Board, constituted under the *Marketing of Eggs Act 1945-1977*, is the statutory authority controlling the commercial production of eggs. The Board is responsible for the collection, handling, examination, grading, treatment, storage, distribution and sale of eggs. From time to time the Board fixes the maximum price at which each respective grade of eggs may be sold by retail.

The State's level of egg production is controlled by the licensing of producers. Under the Act it is an offence to keep, for the purpose of producing eggs for sale, more than twenty fowls unless the person is the holder of a licence to keep laying fowls. The licence authorises the number of fowls the holder may keep.

Until recently, egg production has exceeded local requirements and the surplus has been exported overseas, mainly at unprofitable rates. In order to provide a fund with which to equalise returns from local and export sales the Board, prior to 1 July 1965, made a charge on all eggs sold locally. This charge was subsequently replaced by a levy imposed by Commonwealth legislation which came into operation on 1 July 1965. However, since July 1981 a situation of surplus egg production has no longer existed in Western Australia.

The *Poultry Industry Levy Act 1965* provides for the imposition throughout Australia of a levy on hens not less than six months old kept for commercial purposes. Special exemptions are made in respect of 'broiler breeder hens', being hens used to produce chickens for table purposes. The levy, which does not apply to flocks of fewer than twenty-one hens, nor to the first twenty hens in any flock, is payable fortnightly and may not exceed \$2 annually per bird. In December 1981 the levy stood at 43.2 cents per bird per year.

Under the *Poultry Industry Levy Collection Act 1965* the authority responsible for the collection of the levy in this State is the Western Australian Egg Marketing Board. The *Poultry Industry Assistance Act 1965* establishes a Poultry Industry Trust Fund for the receipt of the

amount of the levy and other moneys. The Act provides for payment from the Fund to a State, by way of financial assistance, of such amounts as the Commonwealth Minister may determine upon the recommendation of The Council of Egg Marketing Authorities of Australia.

Although the Commonwealth Government levy replaces the egg equalisation levies formerly imposed by the several State authorities for the purpose of equalising returns from local markets and export sales, the State authorities continue to make charges necessary to defray the costs of handling, grading and marketing of eggs.

In 1980-81 Christmas Island and Hong Kong were the most important overseas markets for eggs in the shell. Overseas exports of eggs in liquid form (including frozen pulp) in 1980-81 were valued at \$384,850.

Production of chicken meat has increased considerably in recent years. Between 1973-74 and 1980-81 slaughterings of meat chickens rose from 14.0 million to 20.1 million, and this rate of increase is expected to continue.

Under the *Chicken Meat Industry Act 1977*, a person growing meat chickens in batches of more than one thousand for supply or sale to a processor is required to have a contract or broiler growing agreement with that processor.

The form of the agreement is prescribed by regulation.

This legislation was designed to give growers a security of contract, a fair price and the opportunity to share in expansion of the industry.

The Chicken Meat Industry Committee, constituted under the *Chicken Meat Industry Act 1975* (repealed), is continued under this new Act and in addition to attending to general industry matters is responsible for determining the standard price to be paid to growers for broiler chickens, and settling disputes which may arise out of agreements. An arbitrator is appointed if the Committee is unable to reach agreement on the determination of the standard price or the dispute.

Details of poultry numbers in the State at 31 March of the years 1976 to 1981 are given in the next table. The succeeding table shows eggs sold and poultry slaughtered for table purposes over the six years ended 1981.

POULTRY NUMBERS

At 31 March —	Fowls	Ducks	Turkeys
1976	3,616,771	15,304	4,806
1977	3,512,476	2,992	3,017
1978	4,030,930	2,753	1,126
1979	3,780,394	1,180	5,511
1980	3,952,084	5,018	1,401
1981	3,905,520	5,418	1,311

EGG PRODUCTION AND POULTRY SLAUGHTERED (a) FOR TABLE PURPOSES

Year ended 31 March —	Egg production (b)		Poultry slaughtered for table purposes (c)	
	Quantity	Gross value	Dressed weight	Gross value
	'000 dozen	\$'000	tonnes	\$'000
1976	16,320	13,431	19,457	13,865
1977	15,118	14,037	20,513	16,004
1978	15,533	15,477	21,949	19,770
1979	15,706	16,310	23,571	22,536
1980	15,724	17,283	24,176	26,274
1981	16,821	20,409	24,082	30,244

(a) Excludes non-commercial production. (b) Source: Western Australian Egg Marketing Board. (c) Year ended 30 June.

BEEKEEPING

Commercial producers of honey in Western Australia may be divided into three categories. There are a comparatively small number of specialist apiarists, engaged solely or mainly in honey production, who operate on a large scale and transport their hives from district to district. There are also some substantial producers who are engaged in agricultural activities and use their farms as a central site from which they may transport their hives to other areas as necessary. Finally there are the many farmers and orchardists who keep a few hives and produce honey as a minor supplementary activity.

BEEKEEPERS, BEEHIVES AND HONEY PRODUCTION (a) — 1980-81

Classification of hives (a)	Beekeepers (b)		Productive beehives (c)		Honey production	
	Number	Proportion of total (per cent)	Number	Proportion of total (per cent)	Quantity (kg)	Proportion of total (per cent)
40 — 99	49	31.01	2,230	6.29	61,900	3.06
100 — 199	35	22.15	3,613	10.19	151,157	7.47
200 — 299	16	10.13	3,460	9.76	150,721	7.45
300 — 499	34	21.52	11,080	31.26	636,727	31.47
500 — 799	15	9.49	7,355	20.75	610,770	30.18
800 and over	9	5.70	7,705	21.74	412,203	20.37
Total	158	100.00	35,443	100.00	2,023,478	100.00

(a) Excludes details of beekeepers with less than 40 hives. (b) At 30 June 1981. (c) Represents the number of hives at 30 June 1981 from which honey was taken during the year and excludes hives kept for production but from which no honey was taken, nuclei, pollination hives, etc.

BEEHIVES AND PRODUCTION OF HONEY AND BEESWAX (a)

Year	Beehives (b)		Honey production		Beeswax production	
	Productive (c)	Unproductive (d)	Quantity	Gross value	Quantity	Gross value
	number	number	tonnes	\$'000	tonnes	\$'000
1975-76	34,069	5,346	3,354	1,174	53	89
1976-77	36,483	6,083	3,143	1,603	49	123
1977-78	32,378	8,930	1,468	763	27	96
1978-79	30,529	8,129	1,841	1,418	35	114
1979-80	34,229	7,838	2,624	1,837	51	199
1980-81	35,443	9,234	2,023	1,473	37	138

(a) Excludes particulars of beekeepers with less than 40 hives. (b) Number at 30 June. (c) Hives from which honey was taken during the year. (d) Includes hives kept for production but from which no honey was taken during the year, nuclei, pollination hives, etc.

In 1980-81 exports of honey totalled 1,142 tonnes, the export value being \$1,659,147. The principal buyers were the Federal Republic of Germany, which purchased 247 tonnes; Malaysia, 237 tonnes and the Republic of Singapore, 222 tonnes.

THE DEPARTMENT OF AGRICULTURE

A Bureau of Agriculture formed in 1894, became the Department of Agriculture in 1898 when the cleared, arable land in Western Australia was less than 1 per cent of present farm land, no superphosphate was used in Western Australian farming and no wheat varieties were available for the drier areas more than 100 kilometres inland.

In the Department's first twenty-five years, development of the wheat belt was the main activity. The area under cereal crop increased from 30,000 hectares in 1900 to more than 1.6 million hectares in 1930 and 5.3 million hectares in 1980-81.

In the Department's first ten or fifteen years, experiment farms, or 'State farms' were established. The first of these had its origin in plots which were established at Hamel in 1896. Valuable work was carried on at this centre for nearly twenty years in connection with growing of potatoes, fruit, cereals, hops, fodder crops and pasture, and some success was achieved with wheat breeding.

Government farms were opened at Narrogin in 1901 and at Nabawa, forty kilometres north of Geraldton, in 1902. In 1907 a farm at Nangeenan, near Merredin, was taken over from the Lands Department and is now the Merredin Research Station. In the same year a farm was established in the south-west at Brunswick in order to provide object lessons in dairying, as it was felt there were great possibilities of expanding the dairying industry. After functioning for several years this farm was closed and the land was subsequently used for closer settlement purposes.

In 1911 a change was made in the policy of the government farms in the wheat belt and their character changed from 'experimental' to 'experiment' farms and ultimately to 'research stations'. Instead of being conducted mainly with the object of producing revenue they were to be used primarily for collecting information concerning local conditions that would be of value to the district. In addition, wheat, oats and barley were bred and pure pedigree seed produced.

The Department of Agriculture, which has expanded progressively, has a broad role to foster the State's agriculture and to advise on marketing of its products. By representation on the Australian Agricultural Council, it helps establish nationally acceptable policies.

It is the branch of the State Government service which brings scientific advice to farmers, pastoralists and allied industries, conducts a wide range of research and administers relevant Acts of Parliament. It maintains services to assist farmers and its regulatory work consists of carrying out the provisions of some of the laws relating to agriculture.

The operations of the Department are organised into Divisions, Sections or Branches, the heads of which are responsible to the Director of Agriculture, through the Deputy Director and two Assistant Directors.

The Animal Health Division comprises field veterinary services, quarantine and export services, laboratory veterinary services, stock branding and stock movement. The Animal Production Division has separate Branches or Sections dealing with beef cattle, dairy cattle, sheep and wool, pigs, poultry, carcass classification and apiculture. It also is responsible for several research stations. Responsibility for quality control of dairy products and food technology research and extension is the function of the Dairying and Food Technology Division.

The Plant Research Division deals with plant nutrition, crop and pasture agronomy and has Branches or Sections for plant pathology, weed agronomy and biometrics. A diagnostic plant analysis service which uses a multi-channel spectrometer is operated by the Division.

Plant breeding, the quality testing of cereals and other seeds, seed products and grain inspection services, and responsibility for many of the Department's research stations is the function of the Plant Production Division. The greater part of the Department's extension services and country district offices are within the Regional Services Division which co-ordinates most Departmental extension services for farmers, except for specialist veterinary services and horticultural advice. It also includes the Kununurra Regional Office and the associated Irrigation Research Station which focus on establishing tropical irrigation farming.

The Resource Management Division comprises several Branches dealing with rangeland management (the pastoral industries), soil conservation, soil research and surveys, farm water resources and irrigation and drainage. The functions of the Horticulture Division are the responsibility of Sections dealing with fruit, vegetables, viticulture, floriculture, and the horticultural inspection services. The Division also administers several research stations.

The Administration Division comprises the Branches or Sections of Botany (the Western Australian Herbarium), Entomology, Information, Marketing and Economics, and the Library.

Close liaison is maintained with the Agricultural Protection Board.

The Head Office at South Perth houses the main administrative, research specialist and diagnostic staff and there are twenty-four district offices and twenty-four research stations. Most research stations are for the wheat and sheep, beef, and dairying industries but

specific stations cater for fruit, vegetables, poultry, pigs, viticulture and tropical agriculture. An Animal Breeding and Research Institute was established at Katanning in 1980.

Research activities

Investigation and research work is a major function of the Department and has meant much to the State's farming. Cereal breeding and economic assessment of varieties is a continuing process in which more than 6,000 trial plots are planted each year. Cereal varieties bred by the Department have increased the incomes of farmers by many millions of dollars in the years they have been grown. The introduction of new plant species and varieties (including rust-resistant types), the determination of crop rotations for improving yields and maintaining soil fertility, as well as ways to improve district performance and profitability are all part of the investigation and research work.

Research into plant diseases, deficiencies and fertiliser needs are important aspects of the Department's work and success in this field made possible the extensive expansion of farming into light land in the past three decades. The sowing of lupins to provide nitrogen, and the use of trace elements were major factors in developing the sandy soils; the establishment of new subterranean clover species in areas of light rainfall, made possible the ley farming system of cropping in rotation with pastures which greatly expanded the productivity of the State's dry land farming.

Many specific problems and deficiencies have been investigated. Recent important examples are lupinosis disease in sheep, annual ryegrass toxicity, clover scorch and blackleg in rape. Breeding new cultivars is the long term answer to some of these problems and good progress has been made. Sweet lupins are grown for their high protein grain and have become an important field crop. Many research projects are joint efforts between different Divisions. Space precludes a list of all research effort but animal health and nutrition, weed control and efficient sheep, beef, dairy, chicken meat, egg and pig production are part of the constant research stream. Research by the Beef Branch and Carcase Classification Section has originated a commercial system of continuous on-line descriptive classification of beef carcasses in abattoirs. This development is important in the evaluation of carcasses for both producers and the meat industry and the system is being tested in abattoirs throughout Australia. The pig carcass classification system introduced by the Department in 1977 has already resulted in a marked improvement in the quality of pigs produced in Western Australia.

In the horticultural industries, research has helped commercial growers to maintain and expand production in the face of diminishing numbers of growers. This has been achieved by the introduction of new varieties and rootstocks and the development of management techniques to increase quality and yields well above previous levels.

Disease in farm animals is of major economic significance to the agricultural industry, both in its clinical and sub-clinical manifestations. Disease can be due to bacterial and viral infections, parasitic infestations of a wide variety of types, the ingestion of toxic plants and other toxic substances, specific nutritional deficiencies such as selenium, copper, cobalt and vitamin E, inborn errors of metabolism such as Mannosidosis and Glycogenosis, and disorders in metabolism producing diseases such as Hypomagnesaemia and pregnancy toxemia.

The Department provides a diagnostic service for food producing animals in all the areas mentioned above, and, in addition, carries out research into those diseases which are of greatest significance. Notable achievements have been made in the areas of annual ryegrass toxicity, lupinosis, the eradication of pleuropneumonia and the progressive eradication of brucellosis and tuberculosis from our cattle herds, the development of a more objective approach to the prevention of parasitic gastroenteritis in cattle and sheep and in gaining a better understanding of the role of vitamin E in weaner sheep myopathy.

Research in food technology has been directed at developing improved processing methods and better utilisation of produce, especially in relation to sheep meat, abattoir by-products, dairy products and alternatives to fossil fuels, such as vegetable oils.

A soil conservation service was established in the Department in 1947 and since then much information on the incidence and nature of erosion has been collected. Soil losses by water and wind erosion are widespread, particularly in the cereal growing areas. The main thrust of the soil conservation research programme relates to the magnitude of soil loss and its effect on productivity. Studies of the surface hydrology of farmland catchments aim to provide more information relevant to water erosion control and flooding problems. A considerable area of agricultural land has suffered from salt encroachment since clearing. Over 260,000 hectares of once productive land has become too saline for cropping. The Department has carried out considerable research into the reasons for salt encroachment and the measures that can be taken to improve the productivity of saline land. The provision of water supplies in many rural areas has been difficult. Research has developed various means of improved water conservation by the use of roaded catchments and techniques of dam sealing and design. Although the main emphasis has been on soil and water conservation in agricultural areas, an increasing amount of research is being carried out concerning the wider aspects of environmental protection, often in co-operation with other Government Departments. Examples include coastal and river protection, studying and reducing the impact of industrial and urban development and examining possible consequences of activities such as the wood chip industry and the mining of mineral sands.

The Department is responsible for carrying out surveys of rangeland condition and erosion in the pastoral areas and provides maps and descriptions of the resource base of leasehold land. The work is done in collaboration with the Department of Lands and Surveys.

In the north-west of the State the carrying capacity of large tracts of country has been seriously reduced by drought and overgrazing. Officers of the Department have shown that much of this country can be improved by adopting systems of grazing management different from those of the past.

Lupin growing and the production of sheep meat for Middle East markets are two successful agricultural enterprises with which the Department has been closely associated in recent years. Research has established lupins as a source of protein in feeds manufactured for the poultry, pig, sheep and cattle industries. The Department has been engaged in developing management and breeding systems to help satisfy the new market requirements, advising on feeding and accommodation during shipping and discussing market requirements with importers.

Research on tropical crops and pastures is concentrated on the Irrigation Research Station near Kununurra in the Ord River irrigation area. Research is focused on irrigation row crops for tropical areas — sugar cane, rice, oilseeds, legumes, cereals, pharmaceutical and horticultural crops. The sugar pilot farm continues to demonstrate the potential for commercial sugar production in the area.

At Carnarvon the main emphasis is on out-of-season winter vegetables for the Perth market. At the Gascoyne Research Station in Carnarvon, the Department assists growers with research into disease, pest and weed control, variety selection, cultural and irrigation methods, and packaging, marketing and economic developments.

Rangeland management and beef production research is conducted from Derby and Kununurra on various properties, including the adjacent Ord River and Fox River stations, the site of a massive million-hectare regeneration project conducted by the Department. Other rangeland research is carried out on individual properties throughout the pastoral areas.

The Western Australian Herbarium conducts research into the flora of the State. The work is primarily in taxonomy, but studies in ecology, anatomy and cytology are also undertaken.

Advisory services

Extension work is perhaps the Department's most important function and has exercised a powerful influence in publicising and accelerating the adoption of better farming methods. Besides making individual visits to a property where a specific request has been made or where some urgent action is required, extension officers support the formation of farmers' organisations and attend meetings and field days where talks are given to groups of farmers. Many such meetings are held on the Department's research stations but field experiments and demonstrations on farmers' properties also provide venues for extension. Major problems such as farm management, taxation and fertilisers are commonly discussed, along with current difficulties with husbandry practices. Besides such personal contacts, many of the Department's twenty-four district advisory offices send newsletters to farmers in their areas.

Mass media play an important role in extension and about 200 radio broadcasts are given by departmental officers each year. A weekly Press service is also provided and regular publications include the quarterly *Journal of Agriculture* which is distributed to more than 5,000 farmers, a farm Bulletin series, and a *Rangeland Bulletin* for the State's pastoralists. Additions to these services have been *Technotes* (an internal technical advisory service), *Farmnotes* and *Market Information Service*. Since 1968, the Department has made twenty-six half-hour programmes per year for televising to South-West and Great Southern farmers.

Advisory work is largely the function of the Regional Services Division although other Divisions and Branches or Sections of the Department are involved in this activity. Apart from specialist services available from the Department's Head Office at South Perth, advice relevant to country areas is available from officers stationed at district offices at Bridgetown, Busselton, Carnarvon, Derby, Esperance, Geraldton, Harvey, Jerramungup, Kalgoorlie, Katanning, Kununurra, Lake Grace, Manjimup, Meekatharra, Merredin, Midland, Moora, Narrogin, Northam and Three Springs. There has been decentralisation of some services, such as diagnostic tests, to larger regional offices at Albany and Bunbury. The district office at the port of Fremantle is mainly concerned with inspection and quarantine services.

The extension and advisory work of the Herbarium, while it is to a large degree involved in agriculture, is also directed to other activities concerning the utilization and management of the State's flora, including forestry and wildlife research. Research findings not related to agriculture are published in *Nuytsia* and *Western Australian Herbarium Research Notes*.

Other services

Since 1970, and at a cost of \$10.81 million (\$7.31 million Commonwealth, \$3.5 million State) the Department has made considerable progress towards the eradication of brucellosis and bovine tuberculosis from Western Australian cattle. Early in 1980, the Kimberley region was declared a brucellosis free area after a ten-year programme of testing blood samples from more than 300,000 head of Kimberley cattle had demonstrated that the disease was not present. In March 1982, the rest of the State was declared a brucellosis provisionally free area. To achieve this status required all herds to have been assessed for the presence of disease, infected herds quarantined and the infected animals slaughtered. Over 300,000 breeding cattle are tested annually in the eradication programme. Except for the Kimberley region, where eradication continues, Western Australia has been provisionally free of bovine tuberculosis since 1975.

The Department's Animal Health Division has also greatly assisted the increased export of live sheep and cattle by inspection and the issue of health certification.

The Department operates certain services which assist the producer to increase his efficiency. Probably the best known is the production of pure pedigree varieties of seed wheat, oats, barley, sweet lupins, rapeseed and linseed. These are of value to the grower, who is able to obtain his requirements at moderate cost. Sponsoring and supervising the production of approved lines of seed, notably potatoes and beans, has led to the wide use of these specialised lines with a resulting increased yield, and certification of pure lines of pasture seed gives farmers

a guarantee of quality in the seed they buy. A dairy herd recording scheme is administered and subsidised. This enables farmers to gauge the milk yield and mastitis status of individual cows. The central laboratory at Bunbury has enabled an extension of the service and 43 per cent of dairy farms are now covered by the scheme. Determinations of the digestibility of hay and other feedstuffs are also carried out. Milking machines on dairy farms are checked for correct working as a free service. Assistance and technical advice is given to farmers concerned with the installation of irrigation schemes and the preparation of land for irrigation.

A superphosphate application rate prediction service is now available to help farmers decide the best rates of application of superphosphate for their crops and pastures based on previous fertiliser history and on soil test. The service uses the 'Decide' method of superphosphate prediction, developed in co-operation with the Commonwealth Scientific and Industrial Research Organization.

Avondale Project

At the historic Avondale Research Station, Beverley, the Avondale Project dealing with the development of agriculture was created as one of the contributions by the Department to the State's 150th Year Celebrations held in 1979. Officially opened by His Royal Highness, The Prince of Wales, the Project features a fauna and flora reserve, a cultivar garden of historic crop and pasture plants, sheep and cattle displays of breed types found in Western Australia and probably the largest technological collection of farm machinery and artifacts, which have been important to the development of the State's agriculture since settlement in 1829. The Project includes the restoration of the original Avondale stables and homestead, built in the last century. The homestead has been furnished to the period 1900, and Clydesdale horses have been re-introduced. The Station is open to the public.

Administration of Acts

The Department of Agriculture is responsible for administering sixty Acts concerning a wide range of subjects. Some of the more important relate to animal and plant disease and insect pests, industry trusts funds, soil conservation, regulations of the dairy industry, vermin control, marketing of agricultural products and registration of feeding stuffs, fertilisers and stock brands. The Department processes loan applications for the Rural Adjustment Authority.

The Department operates an integrated inspection service to provide quarantine protection for animal, horticultural, agricultural and forest industries against the importation and spread of plant pests and diseases from overseas as well as interstate, and to maintain quality standards of fruit and vegetables supplied to the local market and for shipment overseas. The properties of milk and dairy produce are kept under constant surveillance to ensure the best possible quality to the consumer.

AGRICULTURE PROTECTION BOARD

The Agriculture Protection Board is the body responsible for seeing that the State's agricultural resources are protected from the sometimes devastating effects of certain plant and animal pests.

The Board consists of the Director of Agriculture as Chairman, the Chief Executive Officer as Deputy Chairman, an officer of the State Treasury, two representatives of the Primary Industry Association, one representative of the Pastoralists' and Graziers' Association and five representatives of the Country Shire Councils' Association of W.A.

New legislation affecting the Board's operation was passed in 1976. This was the Agriculture and Related Resources Protection Act which replaced the Noxious Weeds Act and the Vermin Act. Under the new Act, plants formerly called noxious weeds can be declared by the Board to be 'declared plants' and the former vermin to be 'declared animals' for the purposes of the Act.

Responsibility for controlling these declared plants, or declared animals rests with the occupier of land, whether this be a private individual or company, a local government authority,

or a government department. The Agriculture Protection Board's role is to co-ordinate the control effort and see that declared plants and declared animals are dealt with according to its policies. The new legislation provides for local policies to be formulated by Zone Control Authorities on the advice of Regional Advisory Committees. The authorities and committees are made up of farmers, pastoralists and Shire Councillors from each region.

As well as co-ordinating overall agriculture protection policies, the Board advises on methods of control, maintains services to prevent pest animals and plants entering the State, and conducts research into the biology and control of vetebrate pests. The Board also has an operational contract service which landholders can use if they wish to carry out control work.

ADVISORY COMMITTEES

Responsibility for advising the Minister for Primary Industry on various aspects of agricultural activity is vested in a number of advisory committees, whose members are drawn from government departments and authorities, industry organisations and marketing and storage organisations.

These committees include the State Wheat Advisory Committee, the State Coarse Grains Advisory Committee, the State Soil Conservation Advisory Committee and the Ord Project Co-ordinating Committee.

ARTIFICIAL BREEDING BOARD

The Artificial Breeding Board, established in December 1966, under the provisions of the *Artificial Breeding Board Act 1965*, consists of an independent chairman, two representatives of The Primary Industry Association of Western Australia (Inc.), one representative of The Royal Agricultural Society of Western Australia and a veterinary surgeon.

The Artificial Breeding Board Act charges the Board with the responsibility of promoting and developing artificial breeding practices and services. This began when the Board took over the artificial insemination services established by the Department of Agriculture in 1956.

In February 1977 the Board embarked upon a scheme of extensive training of farmers in artificial insemination techniques to inseminate cows in their individual herds — a scheme intended to replace the need for the Artificial Breeding Board's daily insemination service. The transition to a total regime of insemination by herdsmen was completed by mid-1979.

The Artificial Breeding Board provides semen delivery services to the major towns of most cattle breeding districts within the South West Land Division, also farm to farm deliveries to the south-west dairy and beef producers.

Semen stocks maintained at the Board's Administration and Distribution Centre located at Harvey originate from all available areas around the world. Extensive in-store stocks provide breeders with a selective range of sires in each breed. Semen is currently available from eight dairy breeds and thirty-nine beef breeds.

Artificial breeding is increasingly recognised as a reliable means of expanding genetic selection for herd improvement.

FARM MANAGEMENT SERVICE LABORATORY

The University of Western Australia, by resolution of the Senate, approved the establishment of the Farm Management Service Laboratory within the University in 1966. The aims of the Laboratory are to develop concepts and services in management accounting, computer planning and animal breeding which are specially suited to the needs of farmers; to make these developments available to farmers; and to use information processed by the Laboratory for teaching and research at the University of Western Australia.

The Laboratory hires its own staff and computer time, and pays its own operating expenses. Fees are charged to cover costs, though initially the Laboratory drew on capital grants made to it by various firms and institutions through the John Thomson Agricultural Economics Centre at the Institute of Agriculture.

Services provided by the Laboratory include computer techniques for planning farm business and solving farm problems. A set of programmes has been developed to enable farmers to breed at least cost for maximum genetic improvement of economically important traits in sheep flocks and pig and beef herds.

FORESTRY

The Prime Indigenous Forests

Although the prime indigenous forests of Western Australia cover only a small percentage of the area of the State, they are of considerable economic importance. This is not only on account of the durability, strength and general-purpose nature of their hardwood timbers, but also because of their occurrence in the water catchment areas in the high-rainfall and closely-populated section of the State. Being easy to regenerate after cutting, they form a natural and effective protection against soil erosion and provide for the increasing public demand for forest recreation. More than 1.8 million hectares have been permanently dedicated as State Forests and 363,226 hectares of forest land are held as Timber Reserves under the Forests Act and the Land Act.

Jarrah (*Eucalyptus marginata*) is the State's principal timber and the prime forest covers almost 1.5 million hectares of the State Forests. Karri (*E. diversicolor*) is next in importance and is distributed over some 140,000 hectares. Wandoo (*E. wandoo*) accounts for a smaller portion of the dedicated area and Tuart (*E. gomphocephala*), another valuable timber, has a restricted area of about 3,000 hectares. Blackbutt (*E. patens*) occurs in patches throughout the jarrah and karri forests and is an important milling timber with properties and uses similar to jarrah. Marri (*E. calophylla*), the most widespread of the commercial eucalypts, has been used to a limited extent, for building scantling and as a pole timber. Of greatest importance, however, is the use of marri as principal material for an export wood chip industry based on the Manjimup region.

Other eucalypts and many trees of different genera occur within the prime forest belt but they are not of major economic importance. The main distribution of the prime forests, which are practically confined to the south-western portion of the State, is shown on the accompanying map.

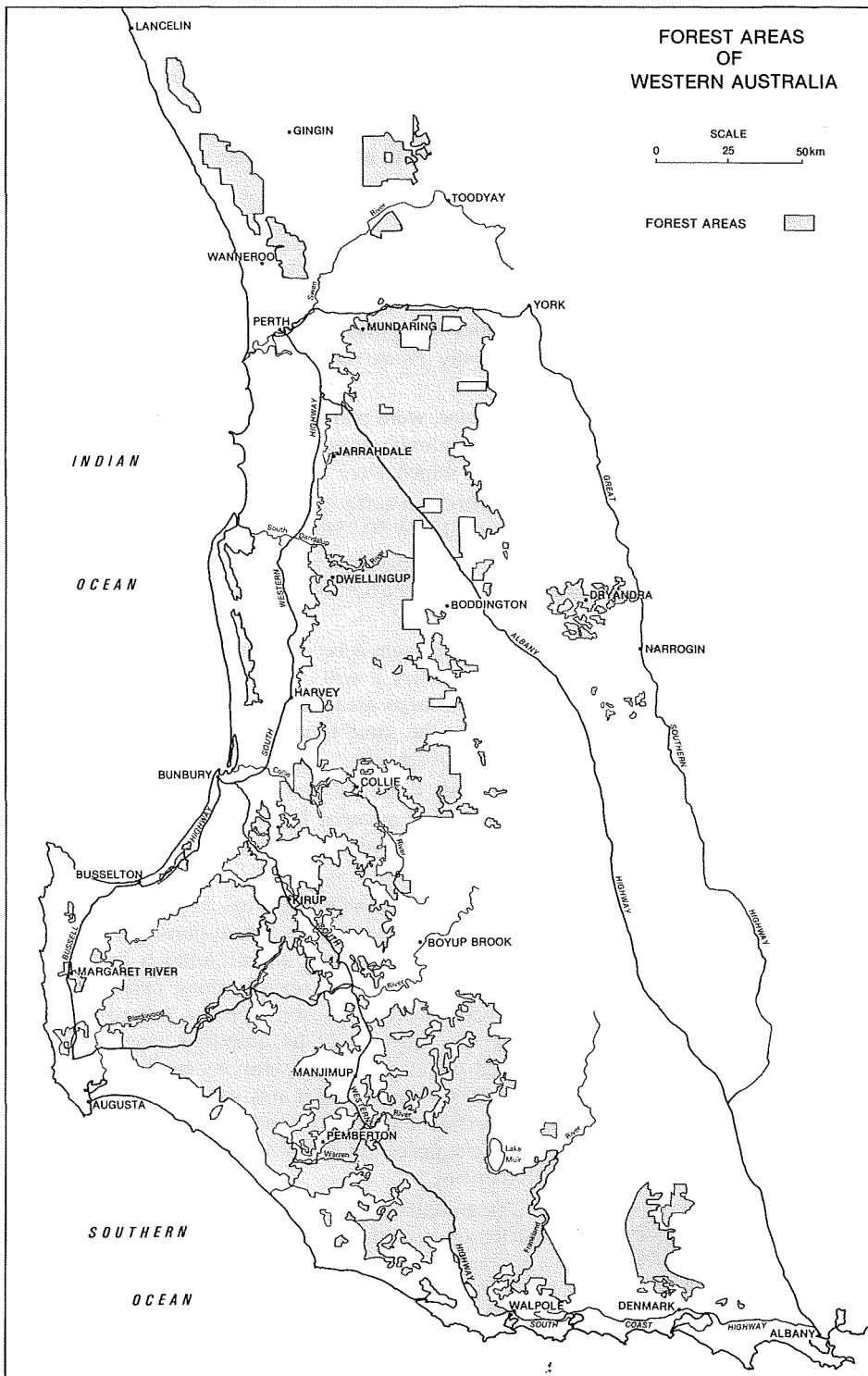
The Inland Forests

Beyond the area of prime forest is an inland sclerophyllous woodland, within which are a number of eucalypts (both tree and mallee form), as well as several types of *Acacia*, such as the wattles and mulgas, tea tree (*Melaleuca spp.*) and casuarinas. Sandalwood (*Santalum spicatum*), indigenous to the wheat belt and semi-arid areas of the State, is still exported to Asian countries but is now obtained only from the semi-arid regions.

While none of the inland woodland can be classed as suitable for sawmilling in the ordinary sense, it forms an important source of timber for mining and agricultural purposes. During recent years, soil conservation in the regions of low rainfall has received increasing attention and the importance of controlling clearing, grazing and firewood cutting has been recognised. The Forests Department maintains a staff to exercise these controls and to advise on tree planting. Work is proceeding with demarcation of areas representing important inland ecotypes for which long-term conservation proposals have been prepared.

Forestry Administration

Scientific forestry was given considerable impetus in Western Australia with the passing of the Forests Act in 1918. Extensive cutting over the previous fifty years had seriously depleted the State's forests and adequate provision had not been made for protection and regeneration. The Act, with significant amendments in 1974 and 1976 confers wide powers on the Forests Department to provide for multiple use management of the forest resource.



The forests are managed within a long range working plan which caters for wood production, water yield, recreation, flora and fauna conservation, amenity and minor product values. Specific areas are accorded a usage priority depending on the natural site potential and the State demand. Trees approved for cutting are marked by trained foresters, who work under the direction of the Conservator of Forests and closely control both the indigenous forest and State pine plantations. The future productivity of the forests is also safeguarded by ensuring that cutting is carried out to protect immature growth and other forest values and to encourage regeneration.

All forest operations are planned to reduce the influence of forest disease. In particular, the introduced jarrah dieback disease (*Phytophthora cinnamomi*) necessitates careful planning and control and special hygiene and quarantine measures are employed.

In future years, if the demand from the increasing population is to be met, it will be necessary to supplement the timber supplies from the natural hardwood forest. For this purpose plantations of exotic pines, principally *Pinus radiata* and *Pinus pinaster*, have been established throughout the south-west.

Only approximately 5,500 hectares of pine were planted in the period from just prior to 1920 up to 1950. These areas were almost entirely experimental and were used to solve the many nutritional and technological problems which were encountered.

Plantings at a higher rate have been undertaken since 1955, bringing the present total State-owned pine plantation area in Western Australia to 50,356 hectares.

Recent plantings have been at just over 2,000 hectares per annum, but this will have to be lifted to approximately 3,000 hectares per annum if the desired self-sufficiency is to be attained by just after the turn of the century.

Much of the land used for pine planting at present is repurchased farmland and although it is intended to continue with the repurchasing policy it will not be possible to obtain sufficient area in this way. Because of this, parts of a large area, south of Busselton, known as the Donnybrook Sunkland are being planted. At the same time plans are also being devised to enhance the conservation and amenity values of the area.

Plantings in the Sunkland, together with those of the Blackwood Valley and others relatively close to Bunbury, will provide the raw material for future, large, integrated pine-utilisation industries such as sawmills, particle board, veneer and plywood plants, and pulp and paper mills.

Because of the hot, dry summers experienced in most of the areas covered by State Forests, there is a considerable risk of damage by fire and intensive precautions are taken by the Department to minimise this danger. Radio-equipped spotter aircraft and key look-out towers provide surveillance of the critical forest areas during prescribed burning periods and during summer. An area of 249,987 hectares was burnt by prescription for hazard reduction in 1980-81 and 83 per cent of this burning was carried out by dropping incendiaries from a low-flying aircraft. Restrictions are placed on all burning operations by farmers and other persons when the fire hazard is high and at such times warnings are issued emphasising the danger. All staff and employees of the Department are available and trained to fill roles in either direct fire fighting or technical support. Fire suppression is planned on the basis of rapid attack with adequate crews for achieving early control.

In association with the system of cutting control, various royalties, licence and permit fees are collected as part of the Consolidated Revenue of the State.

Principal Forest Products

Sawn timber from jarrah and karri is the principal form of forest wood production, but there will be a gradual increase in the use of pine in the future. Karri and locally grown pine logs together with imported logs are used for plywood. During recent years, there has been a

greater use of local logs for plywood manufacture. Small sized logs from thinning pine plantations and manufacturing residues are used for the production of particleboard. Hardwood mill wastes and bush residues of marri and karri now form the basis of an important export woodchip industry located in the southern forests.

In addition to these major wood products, the State's forest wealth includes sandalwood for export, firewood for general purposes, and various seeds and plants for propagation both in Australia and abroad. The karri, wandoo, marri and some inland shrub species are important nectar producers for apiarists, who move their bees to various forest sites in following the nectar flow.

The following table gives details of log production and sawn timber production from 1975-76 to 1980-81.

TIMBER PRODUCTION
(Cubic metres)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Sawlog production (a) —						
Hardwood	1,102,491	1,038,126	1,003,569	963,147	935,416	976,880
Softwood	45,083	45,352	53,788	57,388	60,030	67,062
Other log production (b) —						
Hardwood	98,370	377,021	434,377	472,961	615,488	574,058
Softwood	60,484	75,842	73,437	125,683	136,160	137,478
Sawn timber production —						
Hardwood	383,010	369,151	347,111	331,135	331,411	330,863
Softwood	16,258	16,685	18,669	18,145	21,400	22,954

(a) Includes sawlogs and logs used in the production of plywood veneer.

(b) Includes chipwood.

With increased development and competition for resources the value of State Forests for water production and recreation is becoming increasingly apparent. The current working plan emphasises water production as the major production objective in the northern jarrah forest. Provision to meet the forest recreation needs of the public is also afforded high priority.

Sawmilling and production of timber is also referred to under *Manufacturing* in Part 3 of this Chapter.

In 1980-81 overseas exports of railway sleepers totalled 25,192 cubic metres, the United Kingdom and Belgium-Luxembourg being the main markets. In the same year 32,653 cubic metres of rough, sawn or dressed timber (including railway sleepers) were exported to other Australian States, and 7,264 (other than sleepers) shipped overseas, the principal markets being Belgium-Luxembourg and South Africa.

FISHERIES (INCLUDING WHALING AND PEARLING)

General Fisheries

Since the end of the second World War, rock lobsters have become the most important item of production of the fishing industry. Prior to the war there was a small local market for fresh rock lobsters, but in 1941 production was stimulated by canning for the armed forces. Although canning continued until 1950, it had become far less important by 1947 than another development, the freezing of rock lobster tails for export, mainly to the United States of America. The overseas demand, which developed rapidly in post-war years, gave great impetus to the industry and the take increased greatly after 1947 to a record production of 11,461 tonnes in 1978-79 valued at \$56.8 million. The highest value of catch ever recorded is \$62.1 million in 1979-80. Overseas exports of rock lobster tails in 1980-81 totalled 2,858 tonnes with a f.o.b. value of \$42.5 million.

The most important commercial species of rock lobsters in Western Australian waters is the western rock lobster (*Panulirus cygnus*), which is fished off the south-west coast between Murchison River and Bunbury. The principal localities around which rock lobsters are caught are Houtman Abrolhos, Geraldton, Dongara, Beagle Island, Green Head, Jurien Bay, Cervantes, Lancelin, Ledge Point and Fremantle. The industry is protected from overfishing by such measures as the declaration of closed seasons; the proclamation of fishing zones; the prohibition of the taking of lobsters of less than a prescribed size or of female rock lobsters having berry (i.e.

eggs) attached; requiring that every rock lobster pot shall have an escape gap of specified dimensions; limiting licences for boats for rock lobster-fishing; and limiting the number of pots that a boat may carry or use at any one time. The catch is processed either on specially equipped freezer boats or at shore stations licensed under the *Fisheries Act 1905-1979* as processing establishments.

The catches of Australian salmon (*Arripis trutta*), which school in the bays on the south and lower south-western coasts, yield a large proportion of the production of inshore and beach fishing and are used almost exclusively for canning. The remainder of the catch from this type of fishing comprises chiefly tailor (*Pomatomus saltatrix*), Australian herring (*Arripis georgianus*), western sand whiting (*Sillago schomburgki*), sea mullet (*Mugil cephalus*) and trevally or skipjack (*Caranx georgianus*). This is sold mainly as wet fish on the local market, but large quantities of Australian herring are canned and there are some exports, principally of whiting, to other Australian States. There is an important fishery for southern bluefin tuna (*Thunnus maccoyii*) on the south coast of the State and investigations are being conducted on the commercial potential of tuna stocks in northern waters.

The following table shows the catch and value of fish, crustaceans and molluscs by principal species for Western Australia for the years 1978-79 to 1980-81.

FISH, CRUSTACEANS AND MOLLUSCS: CATCH AND VALUE

Species — Common name	Quantity (a) (tonnes)			Value (b) (\$'000)		
	1978-79	1979-80	1980-81	1978-79	1979-80	1980-81
Fish —						
Barramundi (Giant perch)	35	25	32	64.4	46.0	151.5
Cobbler	176	254	258	306.3	362.5	280.0
Emperor (North-west snapper)	73	91	78	73.3	125.5	193.4
Herring, Australian	913	776	740	252.7	271.7	303.4
Herring, Perth	277	144	169	116.3	62.0	74.4
Jewfish, Westralian	186	184	171	513.3	547.1	600.6
Mackerel, Spanish	126	123	146	158.7	176.5	205.0
Mullet, sea	563	693	675	326.4	402.1	351.1
Mullet, yellow-eye	594	404	575	302.3	234.3	373.5
Pilchard	890	826	1,489	444.9	413.1	744.4
Salmon, Australian	1,133	1,221	1,188	434.8	581.2	718.2
Scaly mackerel	520	746	329	207.8	469.9	193.9
Shark, bronze whaler	188	r 267	185	168.4	288.9	245.6
Shark, whiskery	183	r 326	285	138.2	275.3	310.6
Shark, other	410	r 507	586	261.7	321.5	442.9
Snapper	491	699	793	483.2	811.5	846.8
Tuna, southern bluefin	1,742	2,496	3,254	794.8	2,109.3	2,985.3
Whiting, King George	38	36	36	93.4	119.4	67.4
Whiting, western sand	227	224	191	294.6	309.8	271.3
Other species	775	810	781	649.6	762.1	769.0
Total, Fish	9,540	r 10,852	11,961	6,085.1	8,689.7	10,128.3
Crustaceans —						
Crabs	102	101	82	140.4	167.3	178.0
Prawns — Banana	17	165	103	45.0	526.7	412.2
Brown tiger	1,366	1,044	721	8,143.8	5,480.0	4,125.2
Endeavour	365	291	281	1,283.1	884.4	760.6
Western king	1,620	1,758	1,874	6,267.9	6,131.4	7,732.6
Other species	104	129	104	260.2	388.4	282.9
Total, Prawns	3,471	3,387	3,083	16,000.0	13,410.9	13,313.6
Rock lobsters —	11,461	10,738	9,956	56,819.7	62,082.6	57,156.6
Total, Crustaceans	15,034	14,226	13,121	72,960.0	75,660.8	70,648.2
Molluscs —						
Abalone	305	311	281	965.2	1,050.8	1,449.7
Scallops	396	260	665	111.6	81.8	174.3
Other molluscs	230	267	261	111.4	169.3	363.5
Total, Molluscs	932	838	1,207	1,188.1	1,301.9	1,987.5
TOTAL, WESTERN AUSTRALIA	25,505	r 25,916	26,288	80,233.3	85,652.4	82,764.0

(a) Live (whole) weight.

(b) Gross value paid to fishermen.

The coastal waters northward from the mouth of the Murchison River to North West Cape and Exmouth Gulf are the source of several species of commercial importance. Snapper (*Chrysophrys unicolor*) are caught between the Murchison River and North West Cape during the northern schooling season from May to August. Cod and Spanish mackerel, though in smaller quantities, are also caught between the Murchison River and North West Cape. At Shark Bay a prawn-fishing industry has been successfully established, the catch being processed at Carnarvon. The species caught are the western king prawn (*Penaeus latisulcatus*) and the brown tiger prawn (*P. esculentus*). A prawn fishery has also been established at Exmouth Gulf, the principal species caught being the brown tiger prawn and the western king prawn. Quantities of endeavour prawn (*Metapenaeus endeavouri*) and banana prawn (*P. merguensis*) are also caught. The catch is processed at Learmonth and on freezer boats. As a conservation measure the number of fishing boats licensed to operate has been limited to thirty-five at Shark Bay and twenty-three at Exmouth Gulf. From a catch of 108 tonnes in 1961-62, the State production of prawns increased significantly and in 1977-78 reached 3,940 tonnes. A small fishery, limited to seventeen prawn trawlers, fishes from Nickol Bay. Banana and brown tiger prawns are also caught seasonally at Onslow and Shark Bay.

The first fishing grounds to be exploited were the estuaries and rivers and, although they are not now as important as other grounds, they still provide substantial quantities of fish of a fairly wide variety. The principal species are cobbler (*Chidoglanis macrocephalus*) and yellow-eye mullet (*Aldrichetta forsteri*), sea mullet and Perth herring (*Nematalosa vlaminghi*) most of which are caught in the Swan and Harvey Estuaries and the Peel and Leschenault Inlets. Other species taken include sand whiting, King George whiting (*Sillaginodes punctatus*), tailor, garfish (*Hyporhamphus spp.*) and pilchard (*Sardinops neopilchardus*). Crabs (*Portunus pelagicus*), school prawns (*Metapenaeus dalli*) and western king prawns are also caught commercially in these waters.

FISH, CRUSTACEANS AND MOLLUSCS — CATCH BY METHOD: 1980-81
(Tonnes)

Particulars	Haul net and beach seining	Mesh set and gill netting	Hand lining	Trawling	Pot fishing and drop nets	Other methods	Total
Fish	2,864	2,286	987	18	246	5,560	11,961
Crabs	2	63	—	2	8	7	82
Prawns	—	20	—	3,062	—	1	3,083
Rock lobsters	—	—	—	1	9,946	9	9,956
Molluscs	4	—	—	697	29	477	1,207
Total	2,870	2,369	987	3,780	10,229	6,054	26,289

The Western Australian Department of Fisheries and Wildlife conducts research on a wide range of commercially important fish species such as rock lobsters, prawns, snapper, Australian salmon, pearl oysters and tuna. The Department is also involved in research on recreational fisheries, estuaries, freshwaters and environmental matters relating to fisheries. Much of this research is carried out in association with the Commonwealth Scientific and Industrial Research Organization, other State and Commonwealth bodies and tertiary education institutions.

Research is carried out chiefly at two centres. The marine research centre at Waterman, was built for the Department of Fisheries and Wildlife and incorporates several separate laboratories and a large aquarium with circulating water, for experiments and studies on a wide range of species. A second centre, the Commonwealth Scientific and Industrial Research Organization marine research centre at Marmion was opened in 1976.

Limited commercial production of marron (*Cherax tenuimanus*) began in 1977 following the passing of legislation which established fish farming guidelines, including licensing of marron farms.

Brown trout, rainbow trout and English perch have been introduced into the streams of the south-west. These species together with indigenous stocks of freshwater cobbler, marron, barramundi and cherabin, provided fishing sport for 17,192 licensed amateur inland fishermen during 1980-81.

Whaling

Whaling was conducted along the Western Australian coast from the first years of settlement and whale oil and whale bone were among the earliest exports from the Colony. Activity since then has fluctuated widely and has now ceased altogether. At a meeting held in London in July 1963 the International Whaling Commission imposed a total ban on the taking of humpback whales for an indefinite period in all waters of the Southern Hemisphere. The company operating from Carnarvon, which relied mainly on the taking of humpbacks, ceased whaling activities at its Carnarvon base in August 1963.

From 1963 onwards, the only station operating was at Cheynes Beach, Frenchman Bay, where sperm whaling had been carried on since 1955. The station finally closed in November 1978. In that year 679 whales were taken and 3,478 tonnes of oil were produced.

Pearl-shell Fishing and Pearl Culture

Pearl and pearl-shell fishing has been a valuable industry for many years, the main centre being Broome. The pearls obtained were once an important feature of production but the success of the industry now depends almost entirely on the shell produced and the price obtainable for it. Activities were suspended following the outbreak of war with Japan, when valuable luggers and equipment were lost. After the war recovery of the industry was slow because of a shortage of suitable boats and the difficulty in obtaining experienced divers. In 1953 the rate of progress improved when the services of trained Japanese divers again became available. By 1957 production of the shell had reached the pre-war level of about 1,000 tonnes but because of the depressed state of the market it fell to 765 tonnes in 1958. Except for a slight recovery in 1960, production declined in each year from 1959 until 1964, when 140 tonnes of shell were raised. As a result of the increased demand for shell for pearl culture, production has increased slightly since then.

In 1956 a licence was granted to a company to culture pearls at Kuri Bay in Brecknock Harbour, 209 kilometres north-east of Derby and the initial harvest of pearls was gathered in 1957. Licences have since been issued to other companies and pearl culture farms are now successfully established in Cygnet Bay, Roebuck Bay, Kuri Bay and at Port Smith, south of Broome.

Australian Fishing Zone

The Australian Fishing Zone (A.F.Z.) covering waters within 200 nautical miles of Australia was declared on 1 November 1979. Under licence from the Commonwealth Government, foreign fishing vessels are permitted to fish within the Zone. A number of joint-venture feasibility studies and test fishing programmes have been conducted in the Zone since its declaration.

Chapter VIII—continued

Part 2 — Mining

CENTENARY OF THE DISCOVERY OF THE COLLIE COALFIELDS

Contributed by

Ken Hay, M.B.E., J.P.

(Former Managing Editor, Collie Mail Newspapers Ltd., now retired)

More than 140 years ago a distinguished Scottish surgeon born with the wanderlust, died in Albany after a brief but notable career. He later became the namesake of the State's only coal-producing town — Collie.

Doctor Alexander Collie gave the town its name, though it was more than fifty years after his death that the first hut was built on the coalfield.

Dr Collie, a keen geographer and botanist, came to Western Australia as a surgeon on the H.M.S. 'Sulphur', the escort of the pioneer transport, 'Parmelia'. He led an expedition to the south-west and discovered a river which was named after him, the Collie River. Some years later the town of Bunbury was founded at the mouth of this river. When coal was discovered on the banks of the river, about fifty-five kilometres inland from Bunbury, the small settlement which sprang up took the name of Collie after the river and the surgeon. As the mining settlement grew into a town, the name was retained.

In 1935 the town of Collie marked the centenary of Dr Collie's death by establishing a memorial stone in Forrest Street, in the main business area, where it still stands.

From October 1982 to October 1983 Collie celebrates the 100th anniversary of the discovery of Western Australia's only commercial coalfield. The original event led to a bitter controversy regarding the allocation of a reward of £1,000 (\$2,000) offered by the State Government for the discovery of a commercial coalfield.

The reward, announced in August 1887, was for a payable coalfield within fifty miles (eighty kilometres) of any port in the colony. It is generally believed that coal was first discovered on the Collie River, about five kilometres from where the town now stands, by a shepherd, George Marsh, who was employed by Arthur Perren, a Brunswick farmer. That was in 1883 and Marsh told Perren about the find.

Later, Perren also found traces of coal in the area and he told David Hay, a Bunbury merchant, about the discovery. It was first made public in 1889 when Perren and Hay formed a partnership and agreed to take up, in their joint names, a coalmining lease of 300 acres (121 hectares). Hay had been searching for coal in the Boyanup area. The partners sank a shaft near the river and located a one metre seam at a depth of 3.4 metres. A quantity of coal was discovered and burnt publicly on the Bunbury show ground in the presence of the Governor, Sir Frederick Broome. In another shaft in the same area a 3.4 metre seam was located.

A rift developed between Perren and Hay, both of whom made individual claims for the Government reward. A Select Committee was appointed by the Government to decide who should receive the reward. The Committee found that there had been an agreement between Hay and Perren by which Hay had to take up the 300 acre (121 hectare) lease, in their joint names at his expense and prospect it for coal and other minerals, on equal shares with Perren.

Finally, the Committee found that Perren was the actual discoverer, but 'the subsequent development of the field was greatly aided by the energy displayed by Mr David Hay'.

The Select Committee recommended that the reward be shared by Perren and Hay. However, Hay died while the inquiry was in progress and his share went to his widow, Kate Hay.

In 1890 the Collie Commercial Coal Mining Company was formed with an issue of 20,000 five shilling (fifty cent) shares. A coal deposit that was worked by the company was soon exhausted and in 1892 the Government commenced drilling operations which revealed several easily accessible coal seams on the field.

During 1895 the Government drove a tunnel about 300 metres on an incline into an outcrop about six kilometres east of where Hay and Perren had found coal. This disclosed a workable seam and the tunnel became the Government mine, the first on the field. Later, it became known as the Wallsend Colliery. On 23 March 1896, the Collie coal mining district was thrown open for selection and forty-two leases covering fifty-seven square kilometres were applied for and granted. Work then started on a railway line from Brunswick and it reached Collie early in 1898. By the end of the year the Wallsend colliery was in full production and the output for 1898 totalled 3,564 tonnes.

The following year another colliery, the Proprietary, was opened about two kilometres from the Wallsend and it soon became the field's biggest producer. When the third session of the State Parliament opened in June 1899 the Government announced that the railways in the colony of Western Australia were using 600 tonnes of Collie coal per week.

Three companies were operating on the field in 1900, more than 400 men were employed and during that year the railways used 60,000 tonnes of Collie coal and 40,000 tonnes from Newcastle, New South Wales.

In September 1900, the Collie River District Miners' Association was formed with John Paul as president and George Henderson as secretary. In 1903 Henderson was elected to the Senate where he remained a member for almost twenty years.

Since those early years fortunes have fluctuated on the Collie coalfield. There have been prosperous periods and then 'depressed' years when the companies reduced manpower and 'short time' was worked on the mines because of a lack of coal orders.

From 1898 to 1958 twenty-two deep mines were opened on the coalfield but today only one, Western No. 2 operated by Western Collieries Ltd., is in production.

Open cut mining started in 1943 to meet a war-caused demand for more coal. Amalgamated Collieries Ltd worked the first open cut on the Stockton Leases and it produced more than 1.5 million tonnes of coal before being closed in 1957. Since 1943 nine other open cuts have been started, but only two are now in operation. The Griffin company's Muja open cut, which commenced operations in 1953, is the biggest on the field and to the end of December 1981 it had produced 16,860,257 tonnes of coal. Today the Muja mine is recognised as one of the largest open cut mines in the Southern Hemisphere.

Until 1921 a number of small companies were in operation on the coalfield but Amalgamated Collieries Ltd. was then formed to take over the various companies and several small mines on the field were closed.

A few years later the Griffin Coal Mining Company Ltd was formed and it opened a deep mine about three kilometres south of the town near the Collie River. The company had a hard struggle to survive but after some years it became more firmly established and opened two more deep mines on its leases. In the 1950s Griffin acquired leases in the Muja area about twenty kilometres east of Collie and there, in 1953, it established an open cut mine. Later, the State Electricity Commission built a major power station adjacent to the Muja Leases to use coal from the open cut and the Griffin company's future was assured.

The Collie coalmining industry prospered during World War II and this continued until 1960. Western Collieries Ltd. entered the field in the late 1930s and in 1950 it began open cut

operations at Collie-Burn, but this mine closed three years later. In 1952 the company was working two deep mines, Western No. 1 and No. 2 and it had another open cut in operation in 1954. The No. 1 deep mine and the open cut closed in 1958.

The No. 2 deep mine, the biggest ever worked on the Collie field, is still in operation and up to 31 December 1981 it had produced 10,047,614 tonnes of coal. Western Collieries began working another open cut in 1970 and it is still in operation.

The industry and Collie experienced a major setback in 1960 when Amalgamated Collieries went out of business. All of its deep mines and open cuts were closed and about 400 men lost their jobs.

The State Government assisted in finding other employment for the displaced miners and Western Collieries and the Griffin company gave an estimate of the number of men who could be re-employed in the industry in the following twelve months. Fortunately, more men were able to regain employment in the industry than was at first envisaged.

The closure of Amalgamated Collieries coupled with the use of fuel oil in metropolitan power stations caused uneasiness and uncertainty in the 1960s and during that period there was little development at Collie. However, the Middle East oil crisis in the early 1970s resulted in a new era of prosperity for the coal industry and the town of Collie. The emphasis was again on the use of Collie coal in the then State Electricity Commission's power generating stations. This resulted in major extensions to the Muja station and further work is in progress.

There are known deposits of 2,000 million tonnes of coal in the Collie area and estimates of the quantity which can be extracted economically vary between 400 and 600 million tonnes.

The Collie coal industry is enjoying the most prosperous period in its long history and this has been reflected in recent years in the number of new homes that have been built in the town and surrounding district. Though coal is being produced only at the Western No. 2 and No. 6 deep mines, the Western No. 5 open cut, the Muja open cut and Chicken Creek open cut, much more coal is being put out than when there was a multitude of mines and open cuts in operation on the field.

The Griffin company which operates the Muja and Chicken Creek open cuts, has been granted a 40-year contract for the supply of coal to the State Energy Commission, and Western Collieries has gained a 20-year contract from the State Government.

This has enabled Western Collieries to proceed with the development of another deep mine, Western No. 7, which will replace Western No. 2 when it is worked out.

From 1898, when mining first began at Collie, to 31 December 1981, the field has produced 64,251,732 tonnes of coal.

Although Collie is essentially a coalmining town, about 200,000 hectares of forestry land provide a delightful backdrop to its industrial activities.

Besides being situated on the only producing coal basin in Western Australia it is also the water catchment area for the Wellington Weir, the site of the State's only hydro-electric power station.

While coal mining, forestry activities and water conservation may not appear to mix, in the Collie district they provide a great variety of tourist attractions.

The timber industry around Collie is now only a shadow of what it was sixty or seventy years ago when hundreds of men were employed cutting sleepers for new railway lines and milling timber for the building development that was taking place in the south-west. The richness of the jarrah forests in the vicinity of Collie was evident even before coal production started and the two industries flourished together.

Before the first World War about 1,000 men were working at Worsley, a timber settlement that had been established on the Brunswick railway line eighteen kilometres west of

Collie. Now, in that same area where timber cutters once felled towering jarrah trees, an alumina refinery is being constructed. This project, where hundreds of men are employed, is well advanced and is expected to be completed during 1983.

Although early activities in the forest depleted timber supplies, the Forests Department, in more recent years, has implemented re-forestation programmes and this work is still in progress.

Timber milling is still an active industry in the district, though not on its former scale, and in Collie itself Bunning Bros operate one of the most modern mills in Australia. This mill has been established on the site of the abandoned Proprietary colliery, for many years one of the biggest on the coalfield. The Proprietary was opened in 1911 and was worked for about fifty years, producing 5,607,597 tonnes of coal.

Coal mining and electric power generation are Collie's main industries, but timber milling, wool growing and mixed farming also make useful contributions to the town's economy. Now a new industry, tourism, is making its contribution in the district. This has been assisted by the establishment of a Tourist Bureau in the town and the setting up of a museum which attracts many visitors. The local Historical Society was behind this move and the museum, situated in the old Road Board building at the entrance to Collie, displays a remarkable collection of relics from the pioneering days of the Collie coalfield and the timber industry.

For many years the rather isolated coal town was oblivious of its tourist potential but is now making marked progress in this field.

Situated in the Darling Range 200 kilometres south of Perth and about fifty-five kilometres from Bunbury, Collie nestles in a picturesque valley through which the Collie River flows. The drive from Roelands, on the South-West Highway, through the hills to Collie provides views of some of the most magnificent scenery in the south-west.

There is an Olympic-style swimming pool in the centre of the town, recreation areas for football, soccer, cricket, cycling, hockey, athletics, trotting and squash and other popular sports. About a kilometre from the residential area there is an 18-hole golf course which is fully reticulated and which is used throughout the year, even in the hot summer months.

Marron and red-fin perch are plentiful in the Collie River and fishing is a popular pastime in the spring, summer and autumn. Hundreds of people come to Collie from south-west towns and Perth to fish for marron during the open season from mid-December to the end of April.

The increased activity in the mining and power generation industries has brought more people to Collie and the estimated resident population at 30 June 1981 was 9,200. This expansion has presented new problems and challenges for the local government authority, the Collie Shire Council. It has adopted a commonsense policy of planned and progressive development which has resulted in a marked improvement in public facilities and in the overall appearance of the town.

Collie is not lacking in education centres. There is a Senior High School, three primary schools, a Catholic college for boys and girls and also a convent school for younger students. Evening classes for mature age students are also available in a variety of subjects at the High School.

A major step, as far as the mining industry is concerned, was taken two years ago when a branch of the W.A. School of Mines was opened in the town. A new brick building was built and many mine workers now take study courses at the school that will qualify them for higher positions in the expanding mining industry. As it is believed that, in the future, about 50 per cent of Collie's coal will come from deep mines, compared with about 20 per cent now, the emphasis in the school's training programmes is on deep mining.

Good relations between the mining unions and the companies have been a commendable feature of the Collie coal industry in the past twenty years. In that time work has stopped only

three times, and on each occasion for one day only. Also the stoppages were not caused by any disputes between the employers and the unions.

Collie's record of industrial peace is believed to be unique in mining and other heavy industries in Australia.

DESCRIPTION OF MINING IN WESTERN AUSTRALIA

Although the discovery of gold was of particular significance in the early development of the Western Australian economy, renewed importance of the mining industry in the State began mainly with the considerable expansion associated with iron ore and other minerals which occurred in the late 1960s. This recent growth in importance of the industry is demonstrated by the fact that in 1980-81, value added (see definition at the beginning of this Chapter) by mining establishments in Western Australia was \$1,434 million, or 651 per cent more than in 1968-69 when value added data first became available. Value added by mining establishments in Western Australia in 1980-81 was \$1,123 per head of mean population, compared with the national average of \$422.

The map which follows shows the location of the major operating mining projects in Western Australia at the end of December 1981. The text below describes the development of the mining industry in the State including references to current projects depicted on the map.

The first major developments followed the discovery of *gold* in the Kimberley region of the far north of the State in 1885, although gold had been found in various places previously and other minerals had also been discovered, including copper and lead in the Northampton district, north of Geraldton, and coal at the Irwin River, south of the same town. The Kimberley gold find was followed by extensive prospecting activity resulting in gold strikes between 1887 and 1891 in the Yilgarn, Pilbara, Ashburton and Murchison districts. Rich discoveries in 1892 at Coolgardie and in 1893 at nearby Kalgoorlie were followed by development of the famous 'Golden Mile' between Kalgoorlie and Boulder which became one of the major gold producing areas of the world and, until recently, was the principal source of gold both in the State and in Australia.

Although gold production declined after the exhaustion of surface deposits and the peak production of 64,222,000 grams in 1903, gold mining remained as the major component of the Western Australian mining industry for many years. Since 1903, production of gold has fluctuated markedly. Gold mining has decreased considerably on the 'Golden Mile', and at the end of 1981 only one major gold miner was operating in that area. However, the commencement in 1977 of operations at the Telfer Mine in the Paterson Ranges (currently the largest goldmine in Australia) reversed the generally downward trend in gold production which had existed since 1960. The State's gold production of 6,305,000 grams in 1974-75 was the lowest recorded since 1894; however, the 1980-81 production of 10,532,000 grams was 67 per cent higher than the 1974-75 figure.

Increases in the price of gold during the latter part of the 1970s, and particularly in the last half of 1979, resulted in increased exploration for new gold deposits, as well as the reassessment of old goldmines which had previously been closed. From the low level of \$83 per fine ounce in August 1976, the Australian gold price rose steadily to reach the high figures of \$132, \$150 and \$207 in 1976, 1977 and 1978 respectively. After further steady increases in the first half of 1979, the price accelerated rapidly, reaching \$467 in December 1979 and \$752 in January 1980. During the remainder of 1980, the price fluctuated considerably, but remained within the range \$500 - \$600 per fine ounce for most of the year. Throughout 1981, the price of gold generally tended downwards, with the low figure of \$346 being recorded in November of that year. The decline continued into early 1982 to reach \$293 in March of that year. These recent price levels, however, are still higher in real terms than those prevailing in the mid 1970s and as a result, expenditure on exploration for gold has reached high levels in recent years (see table in the following section *Exploration for Minerals*).

By early 1982, several new mines (including previously abandoned ones, which had been redeveloped) had commenced production of gold, while a number of other projects were still in the evaluation or developmental phase. In addition, the increases in the gold price, combined with improved metallurgical technology, has enabled the profitable retreatment of tailings and residues from earlier gold mining operations.

In the mid-1960s the importance of gold in Western Australia (in terms of value of production) was surpassed by the production of iron ore from the major deposits in the north-west of the State; and by the mid-1970s the value of gold had also fallen behind nickel, petroleum, bauxite and mineral sands. However, subsequent increases in both production and prices resulted in the value of production of gold in 1980-81 being exceeded only by that for iron ore and nickel.

Iron ore in the form of hematite has been mined at Cockatoo Island, in Yampi Sound in the north of the State, since 1951 and limonitic ore was mined at Wundowie in the Darling Range east of Perth for some years from 1948. It was not until the early 1960s, however, following the Australian Government's decision to modify its embargo on overseas exports of iron ore, which had been in force since 1938, that widespread interest in developing the State's iron ore resources occurred. The ensuing activity has resulted in iron ore becoming the major Western Australian mineral with production of 89,209,000 tonnes containing 56,062,000 tonnes of iron, valued at \$954 million in 1980-81. This represents a small decrease over the previous year's production which was the highest production to date.

The State's measured, indicated and inferred iron ore reserves with an iron content of more than 55 per cent were assessed by the State Department of Mines as 33,000 million tonnes at May 1978. The deposits occur mainly in the Pilbara, in the north-west of the State, where major production commenced in 1966 and expanded each year up to 1975-76, when a fall in production was recorded. Since then, production has fluctuated, but had generally tended to decrease, until 1979-80, when a significant increase was recorded. All of the production from this area is exported, mainly to Japan. Ore from Mount Goldsworthy and Shay Gap, east of Port Hedland, is railed to a deepwater port at Finucane Island, just off Port Hedland. Output from Mount Tom Price and Paraburdoo, in the Hamersley Range area south-west of Port Hedland, is railed to Dampier for shipping through loading facilities at Parker Point and East Intercourse Island. From Mount Whaleback in the Ophthalmia Range near Newman, ore is railed to Port Hedland and limonitic ore from Pannawonica in the Robe River valley is railed to Cape Lambert where it is shipped as fines.

Iron ore is also mined at Koolyanobbing, some 450 kilometres east of Perth, where production commenced in 1950. This ore was used mainly for pig-iron production at Kwinana and Wundowie; however, the Wundowie and Kwinana blast furnaces were closed in early 1981 and 1982 respectively, and all ore produced at Koolyanobbing is now exported interstate. The first shipment of ore from the deposits on Koolan Island, adjacent to Cockatoo Island in Yampi Sound, was made in January 1965.

At the end of 1981, a number of new mines were in the planning stage, although lack of markets for the ore was delaying the 'go-ahead' for these projects. In addition, concentrating plants had been constructed at Mount Whaleback and Tom Price, to treat low grade ores which are currently unsaleable. However, iron ore pelletising plants located at Dampier and Cape Lambert closed during 1980, largely because of cost increases caused by the continued escalation in crude oil prices. An improvement in world demand for iron ore could see significant increases in the State's production, initially through utilisation of spare capacity in existing mines, and in the longer term through the opening up of mines currently in the planning stage.

Nickel was discovered in 1966 at Kambalda to the south of Kalgoorlie and there followed a period of rapid expansion in the nickel industry accompanied by a very high level of exploration activity. At the end of 1981 mines were operating at Kambalda and Nepean, south of

Kalgoorlie, and at Agnew and Mt Windarra, north of Kalgoorlie. Weakness in the world market for nickel led to some reduction in production during 1978-79, which continued into 1979-80. Production increased in 1980-81 but was still significantly lower than in 1977-78. Nickel concentrates are exported from Esperance or processed in a smelter at Hampton, near Kalgoorlie, and a refinery at Kwinana for subsequent export in processed form. In 1980-81 production of concentrates was 403,943 tonnes, containing 47,470 tonnes of nickel.

In May 1966 Barrow Island, about 100 kilometres north-east of Onslow, was declared a commercial oilfield. The first shipment of *crude oil* from this field was made on 25 April 1967. Production in 1980-81 (including a small amount produced at Dongara) was 1,529,000 cubic metres valued at \$124.7 million. In July 1970 a *natural gas* field at Dongara, about 100 kilometres south-east of Geraldton, was declared commercially viable and subsequently a 410-kilometre underground pipeline was constructed to supply gas to domestic and industrial users in Perth and heavy industry in Kwinana and Pinjarra. This supply commenced on 1 December 1971. Production of natural gas in 1980-81 (including a small amount produced at Barrow Island) was 884 million cubic metres valued at \$28.1 million. Developmental activities for the exploitation of the North West Shelf natural gas deposits, about 130 kilometres off-shore from Dampier, commenced in 1980. Initially, natural gas will be supplied to industrial users in the Pilbara, and transported by pipeline to Perth and some industrial users to the south of Perth. The second stage of the project involves the overseas export of *liquefied natural gas* in specially constructed tankers. Significant amounts of *condensate* and *liquefied petroleum gas* will also be produced. When the formal 'go-ahead' for the project was announced on 30 September 1980, the capital cost of the project (in terms of January 1980 prices) was estimated at about \$5,000 million. Initial sales of gas are expected to be made in 1984. Exploration for petroleum throughout the State has intensified since 1979 (see following section *Petroleum Exploration*) and a number of oil and/or gas discoveries are currently being evaluated.

Bauxite deposits at Jarrahdale in the Darling Range near Perth were first mined in 1959, and in 1963 the mine began supplying ore to an alumina refinery at Kwinana. Mining commenced further south in the Darling Range in 1972 to supply a new refinery near Pinjarra which began operations in April 1972. Bauxite production from both areas amounted to 12,207,000 tonnes in 1980-81. Bauxite/alumina projects are currently under construction at Wagerup and Worsley, in the southern region of the Darling Range while evaluation of a bauxite deposit at Mitchell Plateau in the far north of the State is currently under way.

Ilmenite, leucosene, rutile, zircon, monazite and xenotime concentrates are being produced from *mineral sands* mined near Capel and treated there and nearby at Bunbury. The ilmenite content is of particular importance because it is virtually chrome-free and little difficulty is experienced in producing a concentrate of high quality. Production of ilmenite concentrates commenced in 1956, when recorded production was 3,346 tonnes. Since 1974, various operators have commenced mining and treatment of mineral sands in the Eneabba-Jurien Bay area north of Perth. However, operations at Jurien Bay ceased during 1977. Some treatment is also carried out at Geraldton. Rutile and zircon are the major products from the Eneabba area, whereas in the Capel area, ilmenite accounts for most of the value of mineral sands production. In 1980-81, ilmenite production was 1,221,707 tonnes, valued at \$32.8 million. Production of rutile was 87,397 tonnes valued at \$25.2 million, zircon 273,679 tonnes valued at \$16.9 million, while the total value of mineral sands produced was \$84.4 million.

The only commercial production of *coal* in Western Australia occurs at Collie in the south-west of the State. (See special article on Collie at the beginning of this Part.) In 1980-81 production from surface and underground mines totalled 3,127,000 tonnes valued at \$63.1 million. Large increases in the price of petroleum have resulted in a growth in the demand for coal and coal output has increased considerably since 1974, after having been fairly stable at

around one million tonnes per annum for a number of years. During the same period, the value of coal per tonne has also increased significantly, as has the amount spent on exploration for coal.

In 1968 large-scale production of *common salt* (sodium chloride) commenced at Lake Lefroy near Kambalda and subsequently production of salt by the solar evaporation of sea water began at Port Hedland, Lake MacLeod near Carnarvon, Useless Loop in Shark Bay and at Dampier. Most of the salt produced is exported. Production in 1980-81 was 5,742,000 tonnes valued at \$57.5 million. *Gypsum* is also extracted in certain areas associated with salt production.

Among other minerals produced in Western Australia are *tin* and *tantalite-columbite* which were discovered at Greenbushes, in the south-west, in 1888. Deposits of these minerals are also mined in the Pilbara region, in the north-west of the State. Production of 730 tonnes of tin concentrate valued at \$6.84 million was recorded in 1980-81, while output of tantalite-columbite concentrate was 234,780 kilograms, valued at \$17.59 million. A new tantalite ore body recently discovered at Greenbushes is thought to be the largest such deposit in the world and is currently being developed for production. *Talc* is produced from deposits at Three Springs, south-east of Geraldton, and at Mount Seabrook near the upper Murchison River. Production in 1980-81 totalled 90,315 tonnes. *Copper*, *lead* and *manganese* have been mined in significant quantities in the past but activity has declined in recent years, although significant amounts of copper, together with cobalt and precious metals, are contained in nickel concentrates produced, and production from a *copper-zinc* mine commenced in mid-1981 at Teutonic bore, 250 kilometres north of Kalgoorlie. *Silver* in Western Australia is produced only as a by-product of processing other minerals, mainly gold although ore from the Teutonic Bore mine, referred to above, also contains significant amounts of silver.

The quarrying of *construction materials* in Western Australia is an important part of the mining industry. However, materials such as sand and gravel, which are in very plentiful supply, are not included in mining statistics because of difficulties in compiling reliable data. In 1980-81 the value of recorded production of building and monumental stone (mainly limestone, granite and sandstone), crushed and broken stone (used mainly for roads, concrete and rail ballast) and crushed and broken limestone, was \$32.6 million. A further 1,259,000 tonnes of *limestone* valued at \$6.07 million was produced for other purposes, including agriculture, cement making, glass making, lime burning and fluxes.

Apart from the minerals mentioned above, a number of deposits of other minerals are expected to be in production in Western Australia in the near future. At Yeelirrie, 400 kilometres NNW of Kalgoorlie, a deposit of *uranium* ore has been discovered. Since late 1980 a metallurgical research plant has been in operation at Kalgoorlie to investigate the treatment requirements of the ore. *Diamonds* have been discovered at various locations in the Kimberley region in the far north of the State and a number of pilot treatment plants are in operation to enable detailed evaluations of the deposits to be made. Initial testing indicates that some individual occurrences may be very rich by world standards. Mining of a *vanadium* deposit at Coates, some seventy kilometres east of Perth, commenced in early 1981, although operations ceased (reportedly temporarily due to marketing problems) shortly thereafter. The ore was being processed nearby at Wundowie, at facilities installed adjacent to the recently closed pig-iron works. Other minerals expected to be produced in W.A. in the near future include tungsten, garnet sands, kaolin and silicon.

MINING STATISTICS

In the Australian Standard Industrial Classification, 'mining' is used in the broad sense to include the extraction of minerals occurring naturally as solids such as coal and ores, liquids such as crude petroleum, or gases such as natural gas, by such processes as underground mining, open-cut extraction, quarrying, operating of wells or evaporation pans, dredging or recovering from ore dumps or tailings. Establishments engaged mainly in dressing or beneficiating ores or other

minerals by crushing, milling, screening, washing, flotation, other (including chemical) beneficiation processes and natural gas absorption and purifying are included. Excluded are establishments engaged mainly in the refining or smelting of ores (other than the preliminary smelting of gold) and in the manufacture of such products of mineral origin as coke, cement or fertilisers.

Mining statistics presented in the following tables are derived from the integrated economic censuses of mining described in the introduction to this Chapter. Definitions of the items in these tables are also given in the introduction. It should be noted that the tables relate only to mining establishments (i.e. establishments at which mine development has commenced) and exclude mining leases at which only exploration is being carried out. The statistics, however, cover all exploration which continues on leases on which development or production has commenced. Separate details of exploration expenditure both on and off production leases are given in tables at the end of this Part.

The year-by-year comparisons in these tables indicate that the growth in the mining industry evident in 1979-80 continued into 1980-81. Employment was at its highest level since the inception of the integrated economic censuses in 1968-69, while capital expenditure was nearly double the previous highest figure (recorded in 1978-79) largely due to commencement of development work on the North West Shelf gas project.

MINING ESTABLISHMENTS — SUMMARY OF OPERATIONS BY INDUSTRY SUB-DIVISION: 1980-81

Industry sub-division		Number of establishments operating at 30 June	Persons employed (a)			Wages and salaries
ASIC code (b)	Description		Males	Females	Total	
						\$'000
11	Metallic minerals	88	12,123	1,465	13,588	281,514
12 - 13	Coal and crude petroleum	5	1,357	215	1,572	35,670
14	Construction materials	34	484	64	548	8,868
15	Other non-metallic minerals	39	590	102	692	13,377
Total mining		166	14,554	1,846	16,400	339,430

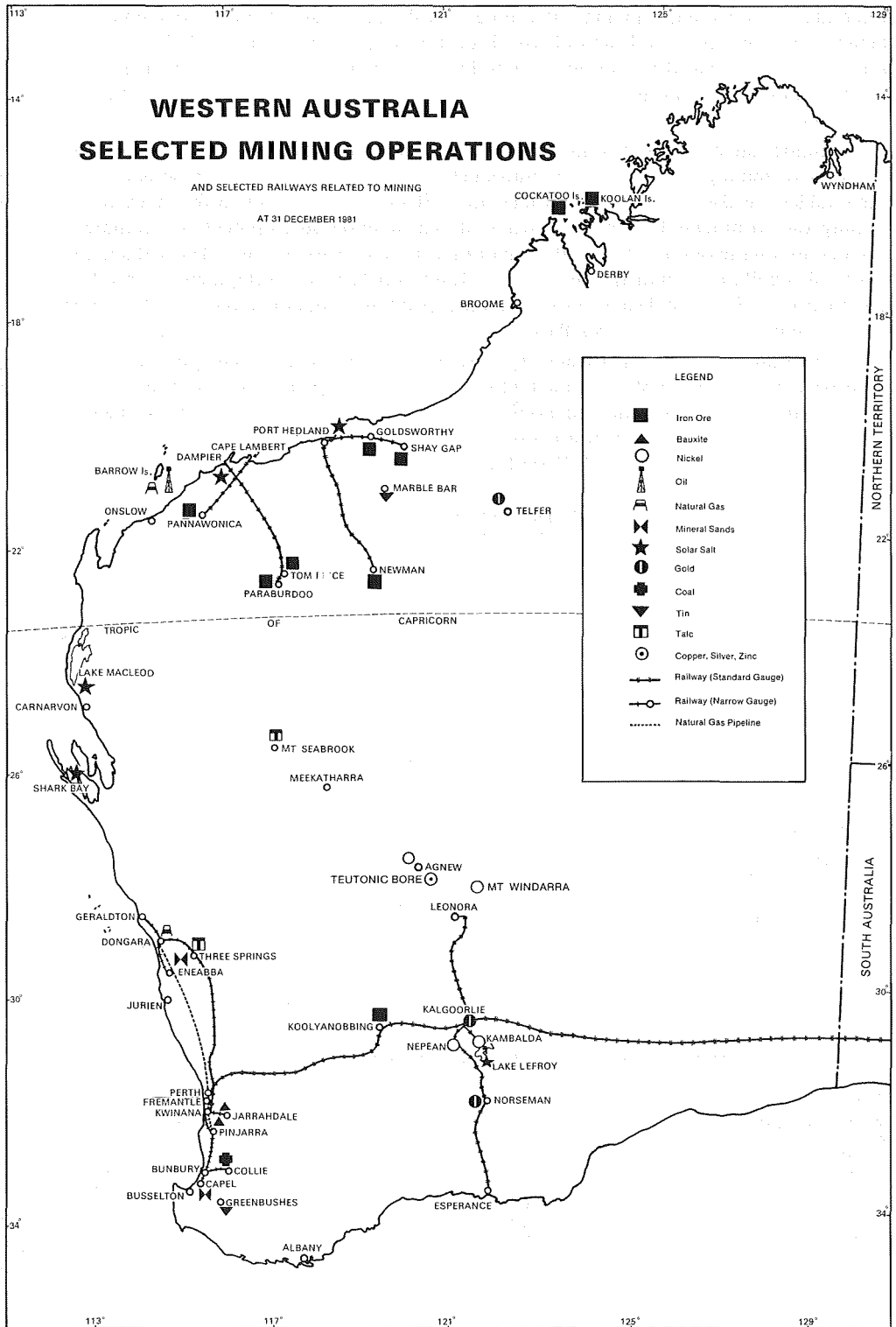
Industry sub-division		Stocks		Purchases, transfers in and selected expenses	Value added	Fixed capital expenditure
ASIC code (b)	Description	Turnover	Opening	Closing		
		\$'000	\$'000	\$'000	\$'000	\$'000
11	Metallic minerals	1,971,623	169,724	263,386	889,951	1,175,334
12 - 13	Coal and crude petroleum	226,467	12,090	20,522	34,658	200,242
14	Construction materials	39,012	3,145	4,266	20,091	20,042
15	Other non-metallic minerals	63,633	5,845	10,077	28,988	38,877
Total mining		2,300,736	190,804	298,251	973,688	1,434,494

(a) Average over whole year. (b) Australian Standard Industrial Classification.

MINING ESTABLISHMENTS — SUMMARY OF OPERATIONS

Item	Unit	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of establishments operating at 30 June	No.	129	134	126	135	153	166
Persons employed (a)							
Males	No.	13,302	13,608	12,999	12,594	13,127	14,554
Females	No.	1,402	1,328	1,248	1,202	1,456	1,846
Total	No.	14,704	14,936	14,247	13,796	14,583	16,400
Wages and salaries	\$'000	163,734	199,013	226,101	220,015	265,378	339,430
Turnover	\$'000	1,167,698	1,387,274	1,602,262	1,650,015	1,934,435	2,300,736
Closing stocks	\$'000	124,667	140,489	162,125	155,949	191,821	298,251
Purchases, transfers in and selected expenses	\$'000	403,240	505,570	668,049	687,298	803,324	973,688
Value added	\$'000	795,585	901,674	942,851	949,865	1,165,283	1,434,494
Fixed capital expenditure	\$'000	161,770	131,981	314,794	337,736	1,167,637	620,405

(a) Prior to 1977-78 at 30 June; from 1977-78 average over whole year.



MINING ESTABLISHMENTS — PERSONS EMPLOYED AND VALUE ADDED BY INDUSTRY
SUB-DIVISION: WESTERN AUSTRALIA AND AUSTRALIA, 1980-81

Sub-division		Persons employed (a)				Value added			
		Western Australia		Australia		Western Australia		Australia	
		No.	Per cent	No.	Per cent	\$'000	Per cent	\$'000	Per cent
ASIC code (b)	Description								
11	Metallic minerals	13,588	82.9	35,032	45.0	1,175,334	81.9	2,446,534	39.4
12 - 13	Coal and crude petroleum	1,572	9.6	33,102	42.6	200,242	14.0	3,353,363	54.0
14	Construction materials	548	3.3	6,590	8.5	20,042	1.4	301,071	4.8
15	Other non-metallic minerals	692	4.2	3,064	3.9	38,877	2.7	112,828	1.8
Total mining		16,400	100.0	77,788	100.00	1,434,494	100.0	6,213,795	100.0

(a) Average over whole year.

(b) Australian Standard Industrial Classification.

The relative importance of metallic mineral mining in Western Australia compared with Australia is clearly illustrated in the table above. This table also reflects the greater importance of coal and petroleum mining in some other States compared with Western Australia. The relatively low contribution by construction materials in Western Australia, by comparison with Australia, is partly the result of sand and gravel not being included in the Western Australian figures.

MINING ESTABLISHMENTS — SUMMARY OF OPERATIONS
WESTERN AUSTRALIA AND AUSTRALIA

Particulars	Year	Number of establishments operating at 30 June	Persons employed (a)	Wages and salaries	Turnover	Value added
				\$'000	\$'000	\$'000
Western Australia	1975-76	129	14,704	163,734	1,167,698	795,585
	1976-77	134	14,936	199,013	1,387,274	901,674
	1977-78	126	14,247	226,101	1,602,262	942,851
	1978-79	135	13,796	220,015	1,650,015	949,865
	1979-80	153	14,583	265,378	1,934,435	1,165,283
	1980-81	166	16,400	339,430	2,300,736	1,434,494
Australia	1975-76	1,271	67,609	782,522	4,257,029	3,021,375
	1976-77	1,277	67,888	927,563	5,062,142	3,514,744
	1977-78	1,352	66,795	1,018,407	5,776,807	3,839,981
	1978-79 r	1,368	67,857	1,096,055	6,561,020	4,406,881
	1979-80 r	1,448	71,924	1,285,502	8,041,951	5,473,443
	1980-81	1,514	77,788	1,594,480	9,329,118	6,213,795
		Per cent	Per cent	Per cent	Per cent	Per cent
Western Australia as a percentage of Australia	1975-76	10.15	21.75	20.92	27.43	26.33
	1976-77	10.49	22.00	21.46	27.40	25.65
	1977-78	9.32	21.33	22.20	27.74	24.55
	1978-79 r	9.87	20.33	20.07	25.15	21.55
	1979-80 r	10.57	20.28	20.64	24.05	21.29
	1980-81	10.96	21.08	21.29	24.66	23.09

(a) Prior to 1977-78 at 30 June; from 1977-78 average over whole year.

MINERAL PRODUCTION — QUANTITY AND EX-MINE VALUE

Mineral	Unit	1978-79		1979-80		1980-81	
		Quantity	Value	Quantity	Value	Quantity	Value
			\$'000		\$'000		\$'000
Bauxite	'000 tonnes	12.919	n.p.	13.309	n.p.	12.207	n.p.
Clays — all kinds (a)	'000 tonnes	2.472	3.764	2.048	4.088	1.853	5.731
Coal	'000 tonnes	2.406	34.484	3.039	54.464	3.127	63.100
Construction materials —							
Building and monumental stone	'000 tonnes	85	779	38	335	43	472
Crushed and broken stone	'000 tonnes	4.173	21.035	3.833	23.334	3.779	25.279
Crushed and broken limestone	'000 tonnes	2.064	3.646	1.338	5.026	1.575	6.891
Copper concentrate	tonne	—	—	—	—	5.205	3.229
Crude oil (b)	'000 cu m	1.706	73.324	1.504	106.577	1.529	124.727
Felspar	tonne	1.132	28	2.430	113	n.p.	n.p.
Gold bullion	'000 grams	15.096	78.709	13.668	154.977	12.369	161.538
Gypsum	tonne	196.752	1.075	243.451	1.901	343.561	2.295
Iron ore and pellets (c)	'000 tonnes	78.845	823.780	91.519	992.868	89.209	953.784
Limestone for industrial purposes (d)	'000 tonnes	1.184	5.261	1.248	4.891	1.259	6.065
Manganese ore	tonne	835	15	1.327	23	1.600	40
Mineral sands —							
Ilmenite	tonne	1.140.898	23.215	1.284.863	26.719	1.221.707	32.836
Leucoxene	tonne	18.994	2.497	26.584	4.471	21.598	4.637
Monazite	tonne	18.164	4.049	13.051	3.611	13.155	4.765
Rutile	tonne	90.070	16.828	106.047	24.098	87.397	25.226
Xenotime	tonne	20	19	24	29	30	55
Zircon	tonne	257.452	12.796	263.367	14.310	273.679	16.909
Natural gas	'000 cu m	834.503	n.p.	861.797	n.p.	883.898	28.142
Nickel concentrate	tonne	352.988	n.p.	347.039	n.p.	403.943	n.p.
Ochre	tonne	135	2	222	4	506	9
Salt	'000 tonnes	4.493	31.639	4.248	32.184	5.742	57.528
Semi-precious stones	..	..	23	..	66	..	40
Silica	tonne	203.685	603	194.050	742	194.472	713
Talc	tonne	127.382	n.p.	160.767	n.p.	90.315	n.p.
Tantalite-columbite concentrate	kilogram	127.472	5.202	166.171	12.339	234.780	17.594
Tin concentrate	tonne	604	5.494	599	6.786	730	6.840
Zinc concentrate	tonne	—	—	—	—	10.129	3.381
Other (value only) (e)	..	..	221.114	..	298.398	..	305.976
Total value	..	..	1.369.381	..	1.772.353	..	1.857.802

(a) Includes bentonite. (b) Value based on price per barrel published by Ampol Petroleum Limited. (c) Excludes ore used for pellet production. (d) Comprises limestone for agriculture, cement making, flux, glass making, lime burning and iron ore pelletising. (e) Includes those minerals for which values are not available for publication.

The preceding tables indicate that mining establishments in Western Australia are generally larger than those in the rest of Australia and output per worker is generally higher, mainly because of the comparative magnitude and capital-intensive nature of the mining projects in Western Australia.

The importance of iron ore to Western Australia is also shown in the following table. Iron ore surpassed gold as the mineral with the highest annual value of production in 1966 and, since 1967, has accounted for more than half the annual value of minerals produced in this State despite production decreases in some recent years. Other noteworthy features are the significant increases in the value of crude oil and gold production because of large increases in the prices of these commodities.

The following table sets out the contents of selected metallic minerals produced. Variations in the contents data shown in this table are, by and large, reflections of variations in production of the parent mineral.

MINERAL PRODUCTION CONTENTS OF SELECTED METALLIC MINERALS

Mineral in which contained	1978-79	1979-80	1980-81
COPPER (tonnes)			
Copper concentrate	—	—	783
Nickel concentrate	3.474	3.117	3.937
Total, Copper	3.474	3.117	4.720
GOLD ('000 grams)			
Gold bullion	12.265	11.310	10.256
Nickel concentrate	56	287	276
Total, Gold	12.321	11.597	10.532
IRON ('000 tonnes)			
Iron ore and pellets (a)	49.755	57.896	56.062
Total, Iron	49.755	57.896	56.062
MONAZITE (b) (tonnes)			
Monazite concentrate	16.901	12.138	12.235
Total, Monazite (b)	16.901	12.138	12.235
NICKEL (tonnes)			
Nickel concentrate	43.944	43.182	47.470
Total, Nickel	43.944	43.182	47.470
SILVER ('000 grams)			
Copper concentrate	—	—	6.894
Gold bullion	1.577	1.504	1.492
Nickel concentrate	57	211	271
Zinc concentrate	—	—	1.600
Total, Silver	1.634	1.715	10.257
TANTALITE-COLUMBITE (kilograms)			
Tantalite-columbite concentrate	(c) 63.771	(c) 69.113	91.929
Total, Tantalite-columbite	(c) 63.771	(c) 69.113	91.929
TIN (tonnes)			
Tin concentrate	432	417	516
Total, Tin	432	417	516
TITANIUM DIOXIDE (tonnes)			
Ilmenite concentrate	663.284	703.303	711.365
Leucoxene concentrate	16.873	24.156	19.444
Rutile concentrate	86.459	101.757	83.928
Total, Titanium dioxide	766.616	829.216	814.737
ZINC (tonnes)			
Zinc concentrate	—	—	3.613
Total, Zinc	—	—	3.613
ZIRCONIUM OXIDE (tonnes)			
Zircon concentrate	170.499	174.792	181.289
Total, Zirconium oxide	170.499	174.792	181.289

(a) Excludes iron in ore for pellets. (b) Phosphate of rare earth metals. (c) Includes a small amount contained in tin concentrate.

EXPLORATION FOR MINERALS

Mineral Exploration (other than for Petroleum)

The data in this section have been derived from the annual Mineral Exploration Census (excluding Petroleum Exploration) which is carried out by the Australian Bureau of Statistics. The first census was conducted in respect of the year 1965 and for further information and statistics in greater detail, the reader is referred to the publication *Mineral Exploration, Australia* (Catalogue No. 8407.0) issued by the Australian Statistician, Canberra.

For the purposes of the census, mineral exploration consists of the search for and appraisal of new ore occurrences and known deposits of minerals (including extensions to deposits being worked) by geological, geophysical, geochemical, and other methods, including drilling. Exploration for water is excluded. The construction of shafts and adits is included if primarily for exploration purposes. Excluded are mine development activities (which include the construction of drives, shafts, winzes, etc.) in underground mines and the preparation of quarrying sites for open-cut extraction (including overburden removal) carried out primarily for the purpose of commencing or extending mining and quarrying operations.

Mineral exploration (other than for petroleum), covers a major portion of the State and is concerned chiefly with exploration for iron, nickel, copper, gold, lead, tin, bauxite, mineral sands, uranium, diamonds and coal.

In the next two tables, details are given of private and State Government exploration in Western Australia over the period 1975-76 to 1980-81.

**MINERAL EXPLORATION (OTHER THAN FOR PETROLEUM)
EXPENDITURE AND DRILLING: 1980-81**

Particulars	Private exploration			State Government exploration (a)	Total (incl. State Government)
	On production leases	On other areas	Total		
Exploration expenditure (\$'000) —					
Wages and salaries	2,305	30,989	33,293	794	34,087
Stores, materials and fuels purchased	1,793	23,773	25,565	75	25,640
Payments to contractors, consultants, etc.	11,954	54,796	66,749	..	66,749
Other current expenses	3,234	42,934	46,168	..	46,168
Net capital expenditure	2,547	12,359	14,905	33	14,938
Total	21,831	164,850	186,681	902	187,583
Drilling expenditure (b) (\$'000) —					
On core drilling	6,389	18,026	24,414	..	24,414
On non-core drilling	3,296	18,524	21,820	..	21,820
Total	9,684	36,550	46,234	..	46,234
Drilling operations ('000 metres) —					
Core drilling	99	295	395	..	395
Non-core drilling	217	812	1,029	..	1,029
Total	316	1,107	1,423	..	1,423

(a) Exploration by the Western Australian Department of Mines.

(b) Included in 'Exploration expenditure' above.

From 1965, expenditure on private exploration in Western Australia rose from \$3,948,000 to a peak of \$86,082,000 in 1970-71. This peak came as the culmination of a period of activity which commenced with the discovery of nickel at Kambalda in 1966 and during which there was a significant increase in expenditure on mineral exploration. This period, which became known as the 'nickel boom', was followed by a period of declining exploration activity, and by 1975-76 private exploration expenditure had fallen to \$50,123,000. Notwithstanding the rate of inflation throughout the 1970s, it was not until 1979-80, when private expenditure on exploration reached \$118,574,000, that the peak of 1970-71 was exceeded. Strong growth in exploration for gold and diamonds was largely responsible for exploration expenditure reaching \$186,681,000 in 1980-81. Expenditure on drilling has fluctuated similarly, with the 1970-71 expenditure of \$21,507,000 remaining as the highest on record until 1979-80, when drilling

expenditure of \$28,368,000 was recorded. In 1980-81 expenditure on drilling increased further to \$46,234,000. However, actual drilling activity, as measured in terms of metres drilled, shows an almost continuous decline from 1971-72 to 1978-79. Despite significant increases in drilling since then the 1,423,000 metres drilled in 1980-81 was still only 72 per cent of the amount recorded in 1971-72.

These fluctuations in expenditure and depth drilled are clearly evident in the graph on the previous page.

MINERAL EXPLORATION (OTHER THAN FOR PETROLEUM) (a) EXPENDITURE AND DRILLING

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Exploration expenditure (\$'000) —						
Wages and salaries	13.789	15.639	16.478	17.693	25.171	34.087
Stores, materials and fuels purchased	5.656	6.315	7.768	8.151	15.908	25.640
Payments to contractors, consultants, etc.	16.763	22.346	21.651	25.943	43.166	66.749
Other current expenses	12.400	16.624	17.039	21.875	27.903	46.168
Net capital expenditure	2.180	4.377	2.611	3.880	7.344	14.938
Total	50.788	65.301	65.548	77.541	119.493	187.583
Drilling expenditure (b) (\$'000) —						
On core drilling	8.022	10.859	10.075	11.052	17.390	24.414
On non-core drilling	6.216	6.143	8.055	7.618	10.978	21.820
Total	14.238	17.002	18.130	18.671	28.368	46.234
Drilling operations ('000 metres) —						
Core drilling	196	168	176	187	352	395
Non-core drilling	681	754	728	637	739	1,029
Total	877	922	904	824	1,091	1,423

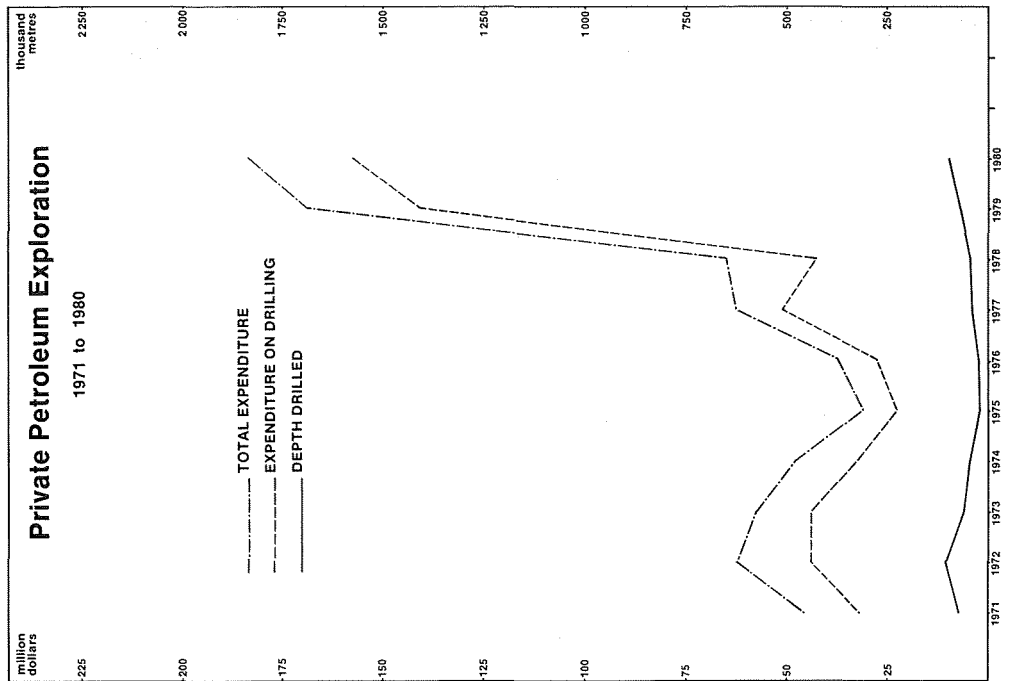
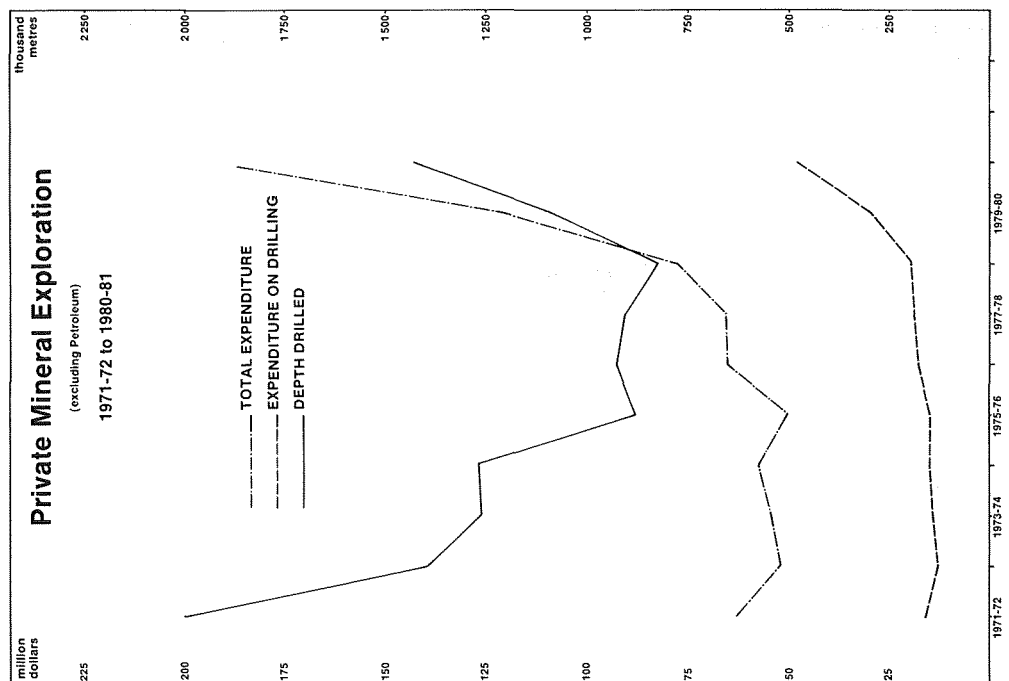
(a) Includes exploration by the Western Australian Department of Mines. (b) Included in 'Exploration expenditure' above.

The two tables that follow show details of private exploration classified by the type of mineral sought and by the size of the enterprise group involved in the exploration. From the first table it can be seen that, until recently, nearly all mineral exploration activity (apart from petroleum exploration) was directed to seeking metallic minerals. More recently, an increasing proportion of exploration expenditure is being directed to the search for diamonds and coal, although in 1980-81 the individual mineral attracting the highest exploration expenditure was gold.

The most notable feature of the second table is the predominance of the larger enterprise groups in mineral exploration. Expenditure on exploration by enterprise groups spending in excess of five million dollars was over 50 per cent of total expenditure in 1980-81, although such groups accounted for only 1.5 per cent of the number of explorers.

PRIVATE MINERAL EXPLORATION (OTHER THAN FOR PETROLEUM) EXPENDITURE BY TYPE OF MINERAL SOUGHT (\$'000)

Type of mineral sought	Total private exploration					
	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Mineral sands	2.496	1.631	290	183	425	826
Uranium	2.291	5.191	6.157	10.058	11.489	12.044
Iron ore		13.942	10.418	7.991	10.379	14.382
Copper, lead, zinc, silver, nickel, cobalt	42.032	37.724	42.245	40.943	35.826	45.943
Gold					21.520	49.003
Tin, tungsten					2.418	3.573
Other metallic minerals					3.317	7.279
Coal	394	385	988	1,438	4,709	11,965
Construction materials			15	12	82	220
Diamonds	2,910	5,696	4,665	16,144	26.886	40,334
Other non-metallic minerals					1,523	1,112
Total	50.123	64.569	64.778	76.769	118.574	186.681



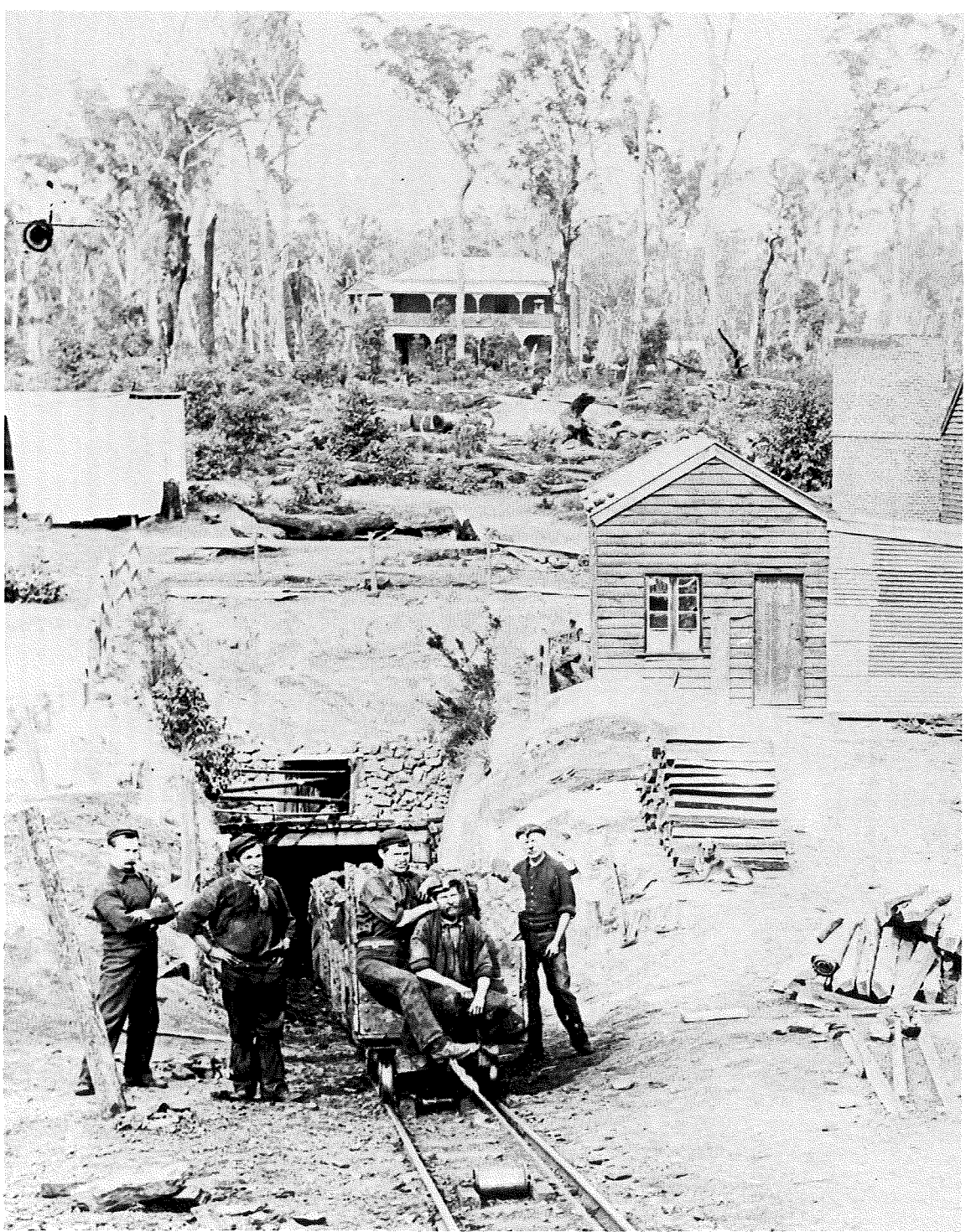


PLATE 11 — Wallsend Mine, early 1930s — near where the centre of Collie townsite is now situated.

Len Stewart



PLATE 12 — Cardiff Mine, circa 1906 — just south of Collie townsite.
Len Stewart



PLATE 13 — Shire Council Offices, Throssel Street, Collie.
Len Stewart



PLATE 14 — The Jarrah forest is both the centre of the timber industry around Collie and a pleasing backdrop to its industrial activities.

Len Stewart

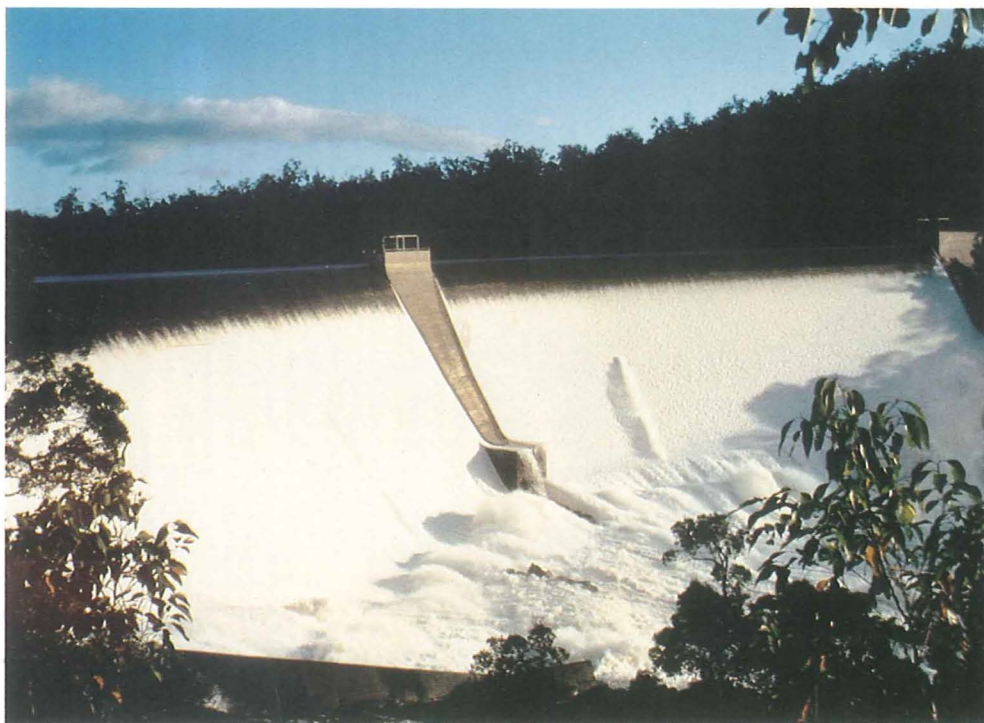


PLATE 15 — Wellington Dam, storage capacity 185 million cubic metres, overflows after the rain and flooding caused by Cyclone 'Bruno' in January 1982.

Len Stewart



PLATE 16 — Muja Open Cut, recognised as one of the largest open cut mines in the Southern Hemisphere with Muja power station in the background.

**PRIVATE MINERAL EXPLORATION (OTHER THAN FOR PETROLEUM)
ENTERPRISE GROUPS (a) CLASSIFIED BY SIZE OF EXPENDITURE**

Size of total expenditure of enterprise groups on mineral exploration	Expenditure						Enterprise groups	
	On production leases		On other areas		Total exploration			
	\$'000	Per cent	\$'000	Per cent	\$'000	Per cent	No.	Per cent
1979-80								
\$10,000 and under	48	—	185	0.2	234	0.2	68	28.0
\$10,001 to \$25,000	122	0.1	512	0.4	634	0.5	38	15.6
\$25,001 to \$50,000	100	0.1	623	0.5	723	0.6	20	8.2
\$50,001 to \$100,000	211	0.2	1,274	1.1	1,485	1.3	19	7.8
\$100,001 to \$250,000	189	0.2	4,484	3.8	4,673	3.9	29	11.9
\$250,001 to \$500,000	434	0.4	9,720	8.2	10,154	8.6	27	11.1
\$500,001 to \$1,000,000	2,045	1.7	14,478	12.2	16,523	13.9	22	9.1
\$1,000,001 to \$2,500,000	2,530	2.1	17,678	14.9	20,207	17.0	13	5.3
\$2,500,001 to \$5,000,000	—	—	10,077	8.5	10,077	8.5	3	1.2
Over \$5,000,000	8,921	7.5	44,943	37.9	53,864	45.4	4	1.6
Total 1979-80	14,600	12.3	103,974	87.7	118,574	100.0	243	100.0
1980-81								
\$10,000 and under	48	—	446	0.2	494	0.3	146	36.9
\$10,001 to \$25,000	92	—	629	0.3	722	0.4	43	10.9
\$25,001 to \$50,000	350	0.2	1,396	0.7	1,746	0.9	47	11.9
\$50,001 to \$100,000	368	0.2	1,885	1.0	2,253	1.2	31	7.8
\$100,001 to \$250,000	673	0.4	8,095	4.3	8,769	4.7	51	12.9
\$250,001 to \$500,000	832	0.4	7,872	4.2	8,703	4.7	24	6.1
\$500,001 to \$1,000,000	1,545	0.8	12,328	6.6	13,873	7.4	20	5.1
\$1,000,001 to \$2,500,000	5,549	3.0	27,457	14.7	33,007	17.7	22	5.6
\$2,500,001 to \$5,000,000	891	0.5	19,936	10.7	20,828	11.2	6	1.5
Over \$5,000,000	11,482	6.2	84,804	45.4	96,287	51.6	6	1.5
Total 1980-81	21,831	11.7	164,850	88.3	186,681	100.0	396	100.0

(a) For the purposes of this table, the total exploration activities of an enterprise group (i.e. a group of companies which are related in terms of the Companies Act) are considered to relate to a single unit, irrespective of the number of returns completed or the number of types of activity in which it engaged.

Petroleum Exploration

Petroleum exploration is defined as consisting of the search for, and appraisal of, deposits of crude oil and gas by geological, geophysical, geochemical and other means, including drilling. Included in the expenditure are the costs of drilling and testing exploratory oil and gas wells. Also included are the costs of access roads, site construction, permits, licences and similar fees, relevant office buildings and furniture, transportation equipment, storage facilities, plant and equipment and review work if primarily for the purposes of exploration for deposits of crude oil or natural gas. Details of drilling developmental wells and expenditure on production facilities, and pipelines, and production costs, etc. are excluded.

An extensive programme of oil exploration commenced in 1952 and resulted in the discovery of flow oil in the Exmouth Gulf area of the Carnarvon Basin in 1953. The discovery proved to be of non-commercial significance, but it stimulated further exploration for oil in Western Australia. In 1964 crude oil was discovered at Barrow Island and commercial production commenced in 1966. The discovery of natural gas at Dongara in 1966 formed the basis of supplies currently piped to the Perth area and nearby industrial users. Very large deposits of natural gas were discovered in 1972 on the North West Shelf, offshore from Dampier and these deposits are currently under development. More recently, further discoveries of oil and/or gas have been made at a number of locations both onshore and offshore, and, as the tables below indicate, exploration activity has been at a very high level.

Information on petroleum exploration expenditure and on drilling in Western Australia for the six years 1975 to 1980 is given in the tables below. These figures have been compiled from data published by the Bureau of Mineral Resources, Geology and Geophysics.

The tables show a significant increase in exploration expenditure in recent years, and particularly in 1979, when expenditure was 160 per cent higher than in the previous year. This partly reflects the high cost of drilling in the off-shore waters of the North West Shelf and the Exmouth Plateau where a significant proportion of the State's exploration is being carried out. While 1980 expenditure of \$183,263,000 was only 8.7 per cent higher than the record 1979 figure, drilling activity continued to show strong growth (depth drilled being 39 per cent higher than in 1979), reflecting increased onshore exploration, where costs are significantly lower than offshore.

PRIVATE PETROLEUM EXPLORATION EXPENDITURE
(\$'000)

Private expenditure	1975	1976	1977	1978	1979	1980
Geological	801	329	536	1,187	1,163	717
Geophysical	3,307	6,323	3,724	16,306	14,247	16,750
Drilling	22,646	27,396	50,810	42,669	140,284	156,341
Other	4,122	2,794	7,375	4,697	12,972	9,455
Total	30,875	36,842	62,445	64,859	168,666	183,263

PRIVATE PETROLEUM EXPLORATION — WELLS AND DEPTH DRILLED

Particulars	Unit	1975	1976	1977	1978	1979	1980
Wells —							
Drilled (i.e. those which reached final depth) —							
As oil producers	No.	—	—	—	2	1	9
As gas producers	No.	1	1	—	—	—	3
As oil and gas producers	No.	1	—	—	—	—	—
Plugged and abandoned	No.	7	4	9	17	17	20
Total	No.	9	5	9	19	18	32
Average final depth of wells drilled	metre	1,939	2,922	3,024	2,511	3,401	2,400
Drilling still in progress at 31 December (uncompleted holes)	No.	1	2	3	1	3	6
Drilled or drilling over 3,000 metres	No.	3	4	8	9	14	17
Depth drilled —							
Completed wells	metre	17,501	17,534	24,326	37,538	58,623	76,807
Uncompleted holes	metre	620	4,017	10,176	2,917	7,850	15,789
Total	metre	18,121	21,551	34,502	40,455	66,473	92,596

Chapter VIII—continued

Part 3 — Manufacturing

Manufacturing in Western Australia does not have the relative importance to manufacturing in Australia which applies to the State's mining industry. Nevertheless, value added (see definition at the beginning of this Chapter) by manufacturing establishments in Western Australia in 1979-80 was \$1,643 million, or \$478 million more than value added by the State's mining establishments. This value added, however, was only 6.4 per cent of all value added by manufacturing establishments in Australia and was \$1,290 per head of mean population compared with the national average of \$1,743.

Owing to the inclusion of manufacturing in the system of integrated economic censuses in 1968-69 it is not possible to compare the statistics in this Part with manufacturing statistics for years prior to 1968-69. The statistics up to 1967-68, however, which are available in the Statistical Summary following Chapter X and in earlier issues of the Year Book, provide a consistent historical record back to the year 1900. At that time 632 factories employing 11,166 persons were recorded, compared with 5,404 factories in 1967-68, employing 67,335 persons.

Up to the early 1950s, manufacturing in Western Australia had grown steadily with some surge in growth during each of the World Wars and a pronounced down-turn during the depression of the early 1930s. Most of the factories were small and medium-sized establishments supplying the small local market and carrying out some processing of the State's primary products for export. The long-established industries such as slaughtering, dairy products processing, brewing, baking, wool scouring, sawmilling, printing, building materials production and the various types of metal fabrication and engineering remain as important components of manufacturing in the State.

Heavy industry and large-scale operations have been a more recent development, although it could be said that heavy industry commenced with the establishment in 1948 of the State Government's wood distillation, charcoal, iron and steel plant at Wundowie, east of Perth in the Shire of Northam. This plant, sold by the Government in 1974, was converted to the treatment of vanadium ores in early 1981 but production was suspended in early 1982 because of weakening world markets. Perhaps the most significant change, however, came when the basis for an integrated industrial complex was established with the opening in 1954 of a large oil refinery at Kwinana, on Cockburn Sound south of Perth. This was followed soon after by a steel rolling mill and later by a series of large plants which have made Kwinana the State's major industrial centre. The interrelated complex of metals, fuels and chemicals plants is served by a fine harbour, a standard gauge railway line linked with mining centres and the other States, and a pipeline from the natural gasfields north of Perth.

The major part of the more recent development of heavy industry in Western Australia has been associated with mineral development (see Part 2 of this Chapter). Two of the plants in the Kwinana complex are directly concerned with metals processing. An alumina refinery, which commenced operations in 1964, processes bauxite mined in the Darling Range and railed about forty-eight kilometres from a crushing plant at Jarrahdale. A nickel refinery, which commenced operations in 1970, processes nickel concentrates and matte transported from Kambalda and Kalgoorlie. In addition, there was a blast furnace which used iron ore from Koolyanobbing, but production was suspended indefinitely in early 1982. Major mineral-

processing plants outside Kwinana also contribute to Western Australia's manufacturing industry. A nickel smelter, to produce nickel matte from concentrates, commenced operations at Kalgoorlie in 1973 and another alumina refinery, at Pinjarra, began operating in 1972. A plant at Australind, near Bunbury, which extracts titanium dioxide from ilmenite mined in the surrounding districts, has been in operation since 1963. In addition, two new alumina refineries are under construction, one at Wagerup, near Waroona and the other at Worsley, near Collie.

Besides providing for heavy industry directly associated with minerals processing, the mining developments of recent years have also given impetus to other manufacturing activity, particularly to industries associated with the provision of capital equipment and other manufactured goods for the major mining projects.

MANUFACTURING STATISTICS

In the Australian Standard Industrial Classification manufacturing is used in the broad sense to relate to the physical or chemical transformation of materials or components into new products. Certain activities, however, which do not fit easily into this definition are included or excluded from manufacturing according to other criteria. Activities which are *included* as manufacturing are grading, testing, filtering, cooling and bulk handling of milk; cotton ginning; publishing, electrotyping, signwriting and bookbinding; installation of lifts and escalators; repair activity usually associated with manufacturing (e.g. engine reconditioning, repair of industrial machinery, ship repair and major repair of aircraft and railway rolling stock); and blending, assembly, bottling and repacking except where otherwise stated. Activities which are *excluded* from manufacturing are washing, packing and dehydrating of fresh fruit; sun-drying of fruit; cleaning or filleting of fish on commission or freezing of whole fish; pulping of eggs; bottling of wine and spirits; repacking of flour, cereal food products and dried fruits; blending or repacking of tea; the making or installation of curtains; custom tailoring and dressmaking; boot and shoe repairs; hewing or rough-shaping of railway sleepers, posts, etc. in the forests; installation of joinery and erection of prefabricated wooden buildings; screening, crushing, dressing or other rudimentary treatment of minerals and construction materials; purification of natural gas; blending of lubricating oils and greases; glazing; motor vehicle repair (except engine reconditioning); repair of household appliances, sporting and photographic equipment, watches, clocks and jewellery, etc.; repair of tractors, and farm and construction machinery; and installation of structural steel, air-conditioning and heating equipment, industrial furnaces or shop fittings.

Production and distribution of electricity and gas are not regarded as manufacturing in the Australian Standard Industrial Classification (ASIC) but are included in a separate Industry Division (Division D: Electricity, Gas and Water). Further details of electricity and gas appear at the end of this Part.

The following tables summarise the results for Western Australia of the Census of Manufacturing Establishments. Definitions of the data items used are contained in the introduction to this Chapter. While the statistics that follow relate mainly to ASIC Industry Sub-divisions, most data items presented are also available at Industry Group and Industry Class levels.

As from the 1975-76 Census, only a limited range of data — employment, and wages and salaries — is being collected from single establishment manufacturing enterprises with less than four persons employed. To facilitate comparisons with previous years, the 1974-75 Census data were published in such a way that a link was provided between past and future series.

The table below relates to manufacturing establishments from which the full range of data is collected under the new collection criteria (i.e. all manufacturing establishments owned by multi-establishment enterprises and single establishment manufacturing enterprises with four or more

persons employed). The succeeding table relates to single establishment manufacturing enterprises with less than four persons employed (i.e. enterprises from which only employment, and wages and salaries data are being collected). As can be readily seen, enterprises in this category contribute only marginally to statistical aggregates other than number of establishments. Data in respect of the larger manufacturers therefore provide reliable information for the evaluation of trends in the manufacturing sector of the economy. All other manufacturing census data presented in this Part relate to manufacturing establishments owned by multi-establishment enterprises and single establishment manufacturing enterprises with four or more persons employed.

MANUFACTURING ESTABLISHMENTS SUMMARY OF OPERATIONS ACCORDING TO INDUSTRY SUB-DIVISION: 1979-80

(Manufacturing establishments of multi-establishment enterprises, and single establishment manufacturing enterprises employing four or more persons.)

Industry sub-division		Number of establishments operating at 30 June	Persons employed (average over whole year) (a)			Wages and salaries (b)
ASIC code (c)	Description		Males	Females	Persons	
						\$'000
21	Food, beverages and tobacco	325	8,315	3,866	12,181	132,802
23	Textiles	29	504	276	780	8,165
24	Clothing and footwear	61	278	1,207	1,485	11,224
25	Wood, wood products and furniture	427	6,222	1,181	7,403	67,328
26	Paper, paper products, printing and publishing	186	4,532	1,823	6,355	69,535
27	Chemical, petroleum and coal products	70	2,781	376	3,157	44,290
28	Non-metallic mineral products	205	4,675	393	5,068	63,215
29	Basic metal products	34	5,468	375	5,843	89,912
31	Fabricated metal products	388	7,187	1,174	8,361	85,601
32	Transport equipment	159	5,395	266	5,661	59,982
33	Other machinery and equipment	262	6,400	956	7,356	79,766
34	Miscellaneous manufacturing	155	1,704	633	2,337	22,385
Total manufacturing		2,301	53,461	12,526	65,987	734,204

Industry sub-division		Stocks		Purchases, transfers in and selected expenses	Value added	Fixed capital expenditure
ASIC code (c)	Description	Turnover	Opening	Closing		
		\$'000	\$'000	\$'000	\$'000	\$'000
21	Food, beverages and tobacco	1,006,095	69,534	80,780	732,908	284,432
23	Textiles	33,956	5,228	9,029	23,613	14,145
24	Clothing and footwear	27,087	2,817	3,199	12,163	15,306
25	Wood, wood products and furniture	279,696	37,694	44,929	157,370	129,560
26	Paper, paper products, printing and publishing	222,408	19,709	23,190	106,446	119,443
27	Chemical, petroleum and coal products	325,501	35,719	45,674	208,643	126,813
28	Non-metallic mineral products	299,833	44,268	50,373	168,430	137,508
29	Basic metal products	1,093,146	164,352	135,456	684,548	379,701
31	Fabricated metal products	375,142	47,879	61,034	235,300	152,997
32	Transport equipment	167,609	15,777	20,345	85,410	86,767
33	Other machinery and equipment	318,794	53,264	66,082	179,155	152,458
34	Miscellaneous manufacturing	109,798	11,890	15,548	69,260	44,196
Total manufacturing		4,259,065	508,133	555,639	2,663,246	1,643,325

(a) Includes working proprietors. (b) Excludes amounts drawn by working proprietors. (c) Australian Standard Industrial Classification.

MANUFACTURING ESTABLISHMENTS
SUMMARY OF OPERATIONS ACCORDING TO INDUSTRY SUB-DIVISION: 1979-80
 (Single establishment manufacturing enterprises with less than four persons employed.)

Industry sub-division		Number of establishments operating at 30 June	Persons employed (average over whole year) (a)			Wages and salaries (b)
ASIC code (c)	Description		Males	Females	Persons	
21	Food, beverages and tobacco	107	157	81	238	\$'000
23	Textiles	26	29	24	53	507
24	Clothing and footwear	22	11	31	42	127
25	Wood, wood products and furniture	338	554	124	678	58
26	Paper, paper products, printing and publishing	112	142	71	213	1,408
27	Chemical, petroleum and coal products	24	34	10	44	440
28	Non-metallic mineral products	58	86	27	113	128
29	Basic metal products	8	13	2	15	249
31	Fabricated metal products	230	371	88	459	20
32	Transport equipment	74	121	26	147	1,141
33	Other machinery and equipment	144	206	72	278	257
34	Miscellaneous manufacturing	168	225	103	328	724
Total manufacturing		1,311	1,949	659	2,608	484

(a) Includes working proprietors. (b) Excludes amounts drawn by working proprietors. (c) Australian Standard Industrial Classification.

MANUFACTURING ESTABLISHMENTS — SUMMARY OF OPERATIONS

(Manufacturing establishments of multi-establishment enterprises, and single establishment manufacturing enterprises employing four or more persons.)

Item	Unit	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Number of establishments operating at 30 June	No.	1,974	2,054	2,035	2,037	2,202	2,301
Persons employed (including working proprietors) —							
Average over whole year —							
Males	No.	53,207	53,696	54,337	53,336	53,001	53,461
Females	No.	12,645	12,257	12,413	12,404	12,231	12,526
Total	No.	65,852	65,953	66,750	65,740	65,232	65,987
Wages and salaries (excluding amounts drawn by working proprietors)	\$'000	434,272	508,931	594,514	629,095	670,772	734,204
Turnover	\$'000	2,034,274	2,435,754	2,886,221	3,031,505	3,498,828	4,259,065
Stocks —							
Opening	\$'000	217,754	298,226	351,782	411,253	511,959	508,133
Closing	\$'000	297,031	353,762	430,140	533,319	510,393	555,639
Purchases, transfers in, and selected expenses	\$'000	1,350,359	1,565,878	1,835,492	1,971,617	2,175,579	2,663,246
Value added	\$'000	763,192	925,412	1,129,089	1,181,953	1,321,683	1,643,325
Fixed capital expenditure	\$'000	102,849	157,779	133,923	173,685	214,316	169,409

MANUFACTURING ESTABLISHMENTS — WESTERN AUSTRALIA AND AUSTRALIA PERSONS EMPLOYED AND VALUE ADDED BY INDUSTRY SUB-DIVISION: 1979-80

(Manufacturing establishments of multi-establishment enterprises, and single establishment manufacturing enterprises employing four or more persons.)

Industry sub-division		Persons employed (average over whole year) (a)				Value added			
ASIC code (b)	Description	Western Australia		Australia		Western Australia		Australia	
		number	per cent of total	number	per cent of total	\$'000	per cent of total	\$'000	per cent of total
21	Food, beverages and tobacco	12,181	18.46	186,353	16.15	284,432	17.31	4,413,836	17.23
23	Textiles	780	1.18	37,499	3.25	14,145	0.86	708,410	2.77
24	Clothing and footwear	1,485	2.25	80,014	6.93	15,306	0.93	1,130,702	4.41
25	Wood, wood products and furniture	7,403	11.22	77,213	6.69	129,560	7.88	1,366,772	5.34
26	Paper, paper products, printing and publishing	6,355	9.63	101,579	8.80	119,443	7.27	2,248,417	8.78
27	Chemical, petroleum and coal products	3,157	4.78	60,294	5.22	126,813	7.72	2,201,360	8.59
28	Non-metallic mineral products	5,068	7.68	45,777	3.97	137,508	8.37	1,294,528	5.05
29	Basic metal products	5,843	8.85	94,107	8.15	379,701	23.11	2,979,464	11.63
31	Fabricated metal products	8,361	12.67	108,985	9.44	152,997	9.31	2,166,107	8.46
32	Transport equipment	5,661	8.58	136,884	11.86	86,767	5.28	2,559,730	9.99
33	Other machinery and equipment	7,356	11.15	159,428	13.81	152,458	9.28	3,182,499	12.42
34	Miscellaneous manufacturing	2,337	3.54	66,051	5.72	44,196	2.69	1,362,150	5.32
Total manufacturing		65,987	100.00	1,154,184	100.00	1,643,325	100.00	25,613,976	100.00

(a) Includes working proprietors.

(b) Australian Standard Industrial Classification.

Most of the manufacturing establishments in Western Australia are located in the Perth Statistical Division (see map inside back cover). The accompanying table shows that in 1979-80 this Division had 80 per cent of the State's manufacturing establishments with 74 per cent of value added in all manufacturing establishments. While manufacturing is carried out in most local government areas within the Perth Statistical Division, major concentrations of establishments are found in certain localities. The large industrial complex at Kwinana has already been mentioned. The City of Stirling, however, had the largest number of establishments of all local government areas in the Division at 30 June 1980 including a major industrial area located at Osborne Park producing a wide range of products.

The City of Fremantle contains a major industrial area at O'Connor, east of the city centre, as well as a number of major factories north and south of Fremantle. Included in the City of Perth are a cement works, a variety of food and clothing factories, and numerous printing and publishing establishments. The City of Canning contains a major industrial area located at Welshpool and a brewery in the locality of Canning Vale. The localities of Coogee and Spearwood in the City of Cockburn have a number of the larger factories, including cement, wool scouring, meat products and paper products establishments. The Midland locality in the Shire of Swan contains large Government railway workshops, which contribute significantly to employment in the area. Other local government areas with large manufacturing establishments are the Shire of Bayswater, the Town of Bassendean and the Cities of Subiaco and Belmont.

Measured in terms of employment (average over whole year), the most important concentrations of manufacturing activity outside the Perth Statistical Division were in the City of Bunbury and the Shires of Manjimup and Harvey in the South-West Statistical Division, the Town of Albany in the Lower Great Southern Statistical Division and the Shires of Port Hedland and Roebourne in the Pilbara Statistical Division.

MANUFACTURING ESTABLISHMENTS — WESTERN AUSTRALIA SUMMARY OF OPERATIONS BY STATISTICAL DIVISION: 1979-80

(Manufacturing establishments of multi-establishment enterprises and single establishment manufacturing enterprises employing four or more persons.)

Statistical division (a)	Number of establishments operating at 30 June	Persons employed (average over whole year) (b)	Wages and salaries (c)	Turnover	Closing stocks	Value added
			\$'000	\$'000	\$'000	\$'000
Perth Statistical Division	1.843	55.717	614.761	3,163.315	450.510	1,221.508
Other divisions —						
South-West	185	n.p.	n.p.	n.p.	n.p.	n.p.
Lower Great Southern	53	1,438	13,920	89,632	11,195	22,065
Upper Great Southern	28	246	1,869	9,228	775	4,195
Midlands	51	878	9,960	56,350	6,475	16,102
South-Eastern	44	894	10,685	159,608	11,026	31,057
Central	55	943	10,022	91,987	13,093	25,898
Pilbara	32	527	9,222	23,806	1,898	15,225
Kimberley	10	n.p.	n.p.	n.p.	n.p.	n.p.
Total	458	10,270	119,444	1,095,750	105,129	421,816
WESTERN AUSTRALIA	2,301	65,987	734,204	4,259,065	555,639	1,643,325

(a) For component local government areas, see list at the end of the Chapter III. (b) Includes working proprietors. (c) Excludes amounts drawn by working proprietors.

The relationship between manufacturing in this State and manufacturing in Australia over recent years may be seen from the data in the following table. Western Australia is not a major manufacturing State and although, in recent years, there has been continuous development and expansion in this sector in Western Australia, the rate of expansion and development is only marginally greater than the rate for Australia as a whole.

MANUFACTURING ESTABLISHMENTS — WESTERN AUSTRALIA AND AUSTRALIA SUMMARY OF OPERATIONS

(Manufacturing establishments of multi-establishment enterprises and single establishment manufacturing enterprises employing four or more persons.)

Area	Year	Number of establishments operating at 30 June	Persons employed (average over whole year) (a)	Wages and salaries (b)	Turnover	Value added
				\$m	\$m	\$m
Western Australia	1974-75 (c)	1,974	65,852	434.3	2,034.3	763.2
	1975-76 (c)	2,054	65,953	508.9	2,435.8	925.4
	1976-77 (c)	2,035	66,750	594.5	2,886.2	1,129.1
	1977-78 (c)	2,016	65,800	639.0	3,079.6	1,170.7
	1977-78 (d)	2,037	65,740	629.1	3,031.5	1,182.0
	1978-79 (d)	2,202	65,232	670.8	3,498.8	1,321.7
	1979-80 (d)	2,301	65,987	734.2	4,259.1	1,643.3
Australia	1974-75 (c)	26,973	1,245,237	8,533.5	35,135.6	14,912.9
	1975-76 (c)	27,507	1,200,440	9,472.4	39,488.4	16,555.8
	1976-77 (c)	26,780	1,175,831	10,535.8	44,816.2	18,814.2
	1977-78 (c)	25,998	1,146,028	11,152.8	48,198.9	19,753.6
	1977-78 (d)	26,065	1,144,549	11,137.6	48,097.4	19,754.4
	1978-79 (d)	26,312	1,143,891	11,966.4	55,211.3	22,230.1
	1979-80 (d)	27,430	1,154,184	13,357.5	65,354.8	25,614.0
Western Australia as a percentage of Australia	1974-75 (c)	7.32	5.29	5.09	5.79	5.12
	1975-76 (c)	7.47	5.49	5.37	6.17	5.59
	1976-77 (c)	7.60	5.68	5.64	6.44	6.00
	1977-78 (c)	7.75	5.74	5.73	6.39	5.93
	1977-78 (d)	7.82	5.74	5.65	6.30	5.98
	1978-79 (d)	8.37	5.70	5.61	6.34	5.95
	1979-80 (d)	8.39	5.72	5.50	6.52	6.42

(a) Includes working proprietors. (b) Excludes amounts drawn by working proprietors. (c) Based on 1969 edition of ASIC. (d) Based on 1978 edition of ASIC.

The following table shows the principal products of manufacturing activity in the State. Owing to the confidentiality provisions of the *Census and Statistics Act 1905*, data for some important commodities including petroleum products, alumina, refined nickel, pig iron, beer and superphosphate are not available for publication.

PRODUCTION, SALES AND TRANSFERS OUT OF SELECTED COMMODITIES

(Manufacturing establishments of multi-establishment enterprises, and single establishment manufacturing enterprises employing four or more persons.)

Commodity	Unit	1978-79			1979-80		
		Production	Sales and transfers out		Production	Sales and transfers out	
		Quantity	Quantity	Value	Quantity	Quantity	Value
				\$'000			\$'000
Aerated waters, canned and bottled	'000 litres	97.662	101.715	37.700	n.p.	n.p.	n.p.
Automotive batteries (new and rebuilt) —							
6 volt	number	7.284	7.253	216	n.y.a.	n.y.a.	n.y.a.
12 volt	number	22.011	21.843	869	21.981	23.021	1.062
Bacon and ham, not canned	tonne	5.516	5.453	22.033	n.y.a.	n.y.a.	n.y.a.
Blocks, concrete (a), in terms of							
400mm x 200mm x 200mm blocks	'000	5.472	5.411	6.293	n.y.a.	n.y.a.	n.y.a.
Boats and ships, total amount received during the year —							
On vessels 5 tonnes gross and less than 50 tonnes	..	(b)	(b)	8.253	(b)	(b)	9.212
On vessels 50 tonnes gross and over	..	(b)	(b)	6.164	(b)	(b)	13.973
Boats, small (less than 5 tonnes) —							
Fibreglass	number	1.516	1.573	5.479	1.094	1.090	3.893
Aluminium	number	n.p.	n.p.	n.p.	n.y.a.	n.y.a.	n.y.a.
Boots, shoes, sandals and slippers (c)	pair	352.883	315.289	4.526	n.y.a.	n.y.a.	n.y.a.
Bread, total value	..	..	..	40.613	..	..	44.881
Bricks, clay (all sizes)	'000	381.092	362.615	48.301	405.730	390.382	60.657
Butter (d)	tonne	1.373	n.p.	n.p.	995	n.p.	n.p.
Cheese (d)	tonne	2.364	n.p.	n.p.	2.866	n.p.	n.p.
Constructional steel, fabricated	tonne	69.623	67.275	75.837	53.468	53.235	62.735
Containers, bags and packets —							
Of paperboard	..	(b)	(b)	18.831	(b)	(b)	20.585
Of paper	..	(b)	(b)	7.355	(b)	(b)	7.961
Cordials and syrups	'000 litres	n.p.	n.p.	n.p.	7.997	7.994	4.670
Furniture —							
Metal or partly metal	..	(b)	(b)	16.449	(b)	(b)	16.994
Wooden (e)	..	(b)	(b)	45.609	(b)	(b)	47.886
Other (excluding seagrass, wicker or cane)	..	(b)	(b)	555	(b)	(b)	4.741
Hoists, cranes and lifting machinery (f)	..	(b)	(b)	9.513	(b)	(b)	9.895
Ice cream (g)	'000 litres	19.329	19.280	9.025	n.y.a.	n.y.a.	n.y.a.
Jewellery and silverware	..	(b)	(b)	4.160	(b)	(b)	5.806
Mattresses, other than inner spring	number	43.118	43.024	593	45.355	45.570	1.009
Meat, fresh (for human consumption) —							
Carcasses, whole or butchered	..	(b)	(b)	88.174	(b)	(b)	109.491
Boned	..	(b)	(b)	113.856	(b)	(b)	139.760
Metal window frames, aluminium	..	(b)	(b)	18.261	(b)	(b)	22.430
Mining and drilling machinery and parts	..	(b)	(b)	20.277	(b)	(b)	26.012
Offal, bones, etc. —							
Edible (heart, liver, brains, etc.)	..	(b)	(b)	7.204	(b)	(b)	8.696
Inedible (welts, horns, hides, etc.)	..	(b)	(b)	17.247	(b)	(b)	18.814
Paints, enamels and clears (h)	'000 litres	6.372	6.340	13.580	6.845	6.753	16.457
Plaster sheets, non-acoustic	'000 sq m	n.p.	3.247	5.650	n.y.a.	n.y.a.	n.y.a.
Prefabricated steel garages, carports and sheds, etc.	..	(b)	(b)	18.056	(b)	(b)	14.847
Ready-mixed concrete	'000 cu m	1.025	1.025	47.018	1.061	1.061	52.004
Roofing tiles — number	'000	33.260	32.956	18.313	36.544	35.163	20.197
area	'000 sq m	2.784	(i)	(i)	3.086	(i)	(i)
Signs and advertising displays (excl. neon)	..	(b)	(b)	3.666	(b)	(b)	4.720
Small goods	..	(b)	(b)	19.290	(b)	(b)	23.097
Solar absorber units for hot water systems (effective area)	sq m	91.903	88.721	11.018	n.y.a.	n.y.a.	n.y.a.
Stock and poultry foods —							
Meat and bone meal	tonne	38.631	40.682	8.312	32.340	32.283	8.441
Other prepared stock and poultry food (j)	tonne	185.167	189.097	31.555	216.598	215.764	41.084
Tallow, rendered — edible	tonne	2.375	2.460	1.308	n.y.a.	n.y.a.	n.y.a.
inedible	tonne	28.845	29.028	11.874	26.250	26.718	12.531

PRODUCTION, SALES AND TRANSFERS OUT OF SELECTED COMMODITIES — *continued*
(Manufacturing establishments of multi-establishment enterprises, and single establishment manufacturing enterprises employing four or more persons.)

Commodity	Unit	1978-79			1979-80		
		Production		Sales and transfers out	Production		Sales and transfers out
		Quantity	Quantity		Quantity	Quantity	Value
				Value			
				\$'000			\$'000
Timber —							
Undressed (k) —							
Sleepers	cu m	56.624	52.526	7.017	50.978	36.501	6.296
All other (excl. palings) obtained from logs sawn in the mill	cu m	279.436	271.751	37.558	290.417	281.899	47.489
Kiln dried	cu m	20.615	(i)	(i)	27.245	(i)	(i)
Wool, scoured (from greasy, shorn wool)	tonne	16.129	—	—	20.161	—	—
Woven or linked wire fabric (l)	..	(b)	(b)	n.p.	(b)	(b)	6.643

(a) Basic building and paving blocks for walks, partitions, foundations, flooring, paths, etc. and decorative blocks, lintels and sill blocks. Excludes architectural screen and similar fancy blocks. (b) Only value of sales and transfers out is collected. (c) Excludes footwear solely of rubber. (d) Source — production only: Department of Agriculture. (e) Includes prefabricated wooden furniture but excludes in-built furniture. (f) Includes electric hoists. Excludes hydraulic hoists for trucks. (g) Includes ice cream combined with other confections including those aerated, milk-based confections which contain 10 per cent or more butterfat. (h) Includes architectural, decorative and industrial paints. Excludes water paints in powder form. (i) Only quantity produced is collected. (j) Includes poultry pellets, crumbles and mash. Excludes cereal grain and oilseed cakes and meals. (k) Includes preserved timber. (l) Steel and non-ferrous (including chain, wire, link mesh, fencing wire, crimped fabric and fine wire mesh).

ELECTRICITY AND GAS PRODUCTION AND DISTRIBUTION IN WESTERN AUSTRALIA

On 1 July 1975 the Government of Western Australia combined the State Electricity Commission and the Fuel and Power Commission to form a new organisation known as The State Energy Commission of Western Australia under the provisions of the *Acts Amendment (State Energy Commission) Act 1975*. The new Commission is specifically charged with the responsibility for ensuring the effective and efficient utilisation of this State's energy resources and for providing its people with economical and reliable supplies of electricity and gas.

Prior to the formation of the State Energy Commission the production and distribution of electricity and gas was the sole responsibility of The State Electricity Commission of Western Australia, established in 1946.

Electricity

Before the establishment of the State Electricity Commission, electricity was generated and distributed by a large number of independent authorities operating numerous power stations, while a government-owned steam power station at East Perth supplied much of what was then the metropolitan area. Small units, of similar type but privately owned, operated in the major mining centres of Collie and Kalgoorlie. With other minor exceptions, all country areas were dependent on internal combustion equipment from which the local operating authorities supplied either alternating or direct current at various voltages.

Since 1946 numerous districts and towns have been connected to the Commission's grid system and many small independent power stations from which supply was previously drawn have been closed. The Commission also owns and operates diesel power stations at Esperance, Fitzroy Crossing, Halls Creek, Kondinin, Kununurra, Onslow and Port Hedland. Small systems too remote to be connected to the grid system or supplied from the Commission-owned diesel stations, and still controlled by local government authorities, are being absorbed in a leasing arrangement whereby the local distribution system and generating plant is operated by the Commission under an arrangement known as the Country Towns' Assistance Scheme. Under the scheme the Commission undertakes to operate, maintain, replace or upgrade plant and supply equipment as necessary. The benefits of the scheme, which include bulk purchase of fuel and lubricants, rationalisation of spare parts requirements for generation and distribution, centralised billing and administration, the availability of plant from the Commission's pool and

the Commission's technical expertise, have enabled tariffs in country areas to be reduced so that the price of all metered units of electricity throughout the State is now uniform. At the present time there are twenty-five country towns supplied under the provisions of the Country Towns' Assistance Scheme.

The Commission supplies most of the electricity sold throughout Western Australia and all electricity sold in the metropolitan area. In addition, significant amounts are generated by large mining and minerals processing enterprises for their own use. At 30 June 1981 the Commission was operating coal-burning power stations at South Fremantle (100 MW), Bunbury (120 MW), Muja (640 MW), and a coal-burning and oil-burning power station at Kwinana capable of producing 900 MW from four oil-burning units (4 x 120 MW), two dual coal-burning and oil-burning units (each capable of 120 MW when burning coal and 200 MW when burning oil) and a 20 MW gas turbine. A small hydro-electric station of 2 MW capacity is situated near Collie at Wellington Dam, and at Geraldton in the mid-west a 20 MW gas turbine is also connected into the grid system.

The main interconnections with the grid system are two 330,000 volt transmission lines from the Kwinana Power Station, two 132,000 volt transmission lines from the Bunbury Power Station and two 132,000 volt and two 320,000 volt transmission lines from the Muja Power Station. An additional 132,000 volt line connects the Muja and Bunbury Power Stations. Transmission lines of 132,000 volt or 66,000 volt connect major outlying centres such as Merredin, Geraldton and Albany to the grid system.

In December 1959, an amendment to the then State Electricity Commission Act was passed to enable customers to contribute towards the extension of mains beyond the distance which can be supplied economically by the Commission. At 30 June 1982 approximately 21,302 customers had been connected in country and metropolitan areas under the Contributory Extension Scheme. At the same date there were 463,586 electricity customers served by the Commission.

Gas

Town gas production in Western Australia ceased in December 1972 with the conversion of town gas appliances to burn natural gas from the gasfields in the region of Dongara, south of Geraldton. These natural gasfields are relatively small but are estimated to have sufficient reserves to supply the domestic market and a limited industrial market until the mid 1980s. By then, however, gas supplies from the North West Shelf are expected to be available (see Part 2 of this Chapter).

The State Energy Commission supplies natural gas to much of the metropolitan area and to the towns of Pinjarra and North Pinjarra some eighty-five kilometres to the south of the capital. In the Commission's supply area the total length of mains installed for the distribution of natural gas was 4,300 kilometres and the maximum daily output was 19.93 million MJ in the year ended 30 June 1982. At the same date there were 107,995 natural gas customers served by the Commission.

Simulated natural gas is produced and supplied in the Bunbury area and tempered liquid petroleum gas is supplied to the Albany area by the State Energy Commission. The Fremantle Gas and Coke Company Limited, a private gas supply company, supplies natural gas to customers within its franchise area which extends eight kilometres from the centre of Fremantle.

The State Energy Commission maintains an advisory service to assist its customers in such things as the selection and economical operation of both gas and electric appliances.

ELECTRICITY AND GAS STATISTICS

The electricity and gas industries, which are not included with manufacturing in the Australian Standard Industrial Classification, are the subject of a separate census which is conducted periodically. The results of the Census of Electricity and Gas Establishments for the year ended 30 June 1980 appear in the table below.

ELECTRICITY AND GAS ESTABLISHMENTS — SUMMARY OF OPERATIONS: 1979-80

Number of establishments operating at 30 June	Persons employed (average over whole year) (a)			Wages and salaries \$'000	Turnover \$'000	Stocks		Purchases, transfers in and selected expenses \$'000	Value added \$'000
	Males	Females	Total			Opening	Closing		
13	5,390	386	5,776	82,954	382,772	24,867	38,902	191,979	204,828

(a) Includes working proprietors.

Production of electricity and gas in Western Australia over the six years ended 1980-81 is shown in the following table. Electricity generated by Government establishments has increased steadily over the period from 3,904 to 5,543 million kilowatt hours.

PRODUCTION OF ELECTRICITY AND GAS

Item	Unit	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Electricity generated — Government	million kWh	3,904	4,240	4,556	4,815	5,231	5,543
Gas available for issue through mains	million MJ	31,261	31,767	30,426	31,259	32,280	32,651

CHAPTER IX — TRADE, TRANSPORT AND COMMUNICATION

Part 1 — External Trade

Overseas trade statistics are compiled from information contained in documents prepared by importers and exporters or their agents in accordance with the Customs Act. Particulars of Western Australia's overseas trade, as presented in this Part, have been derived from data supplied by the Australian Bureau of Statistics, Canberra.

Statistics of Western Australia's trade with other Australian States are compiled by the Western Australian Office from information contained in documents collected under authority of the *Census and Statistics Act* 1905 from importers, exporters and other persons concerned with the distribution of goods.

Classification of Commodities

Overseas imports and exports are classified according to the Australian Import and Export Commodity Classifications of some 6,600 import items and 2,500 export items. These classifications are based on the *United Nations Standard International Trade Classification, Revision 2*, which is closely related to the Customs Co-operation Council Nomenclature (previously known as the Brussels Tariff Nomenclature) used in the Australian Customs Tariff. The Standard International Trade Classification consists of 10 broad commodity categories designated 'Sections' and comprising 62 commodity 'Divisions' which are further divided into 233 commodity 'Groups'. The structure of the classification serves to provide a summary of data relating to 1,826 basic items of international trade.

Interstate imports and exports are classified according to Interstate Trade Commodity Classifications which are based on the Australian Commodity Classifications. The basic items of the Australian classifications are compressed or expanded according to their significance in Western Australia's trade. The Interstate Trade Commodity Classifications comprise some 506 items of import and 216 items of export within the structure of commodity Sections, Divisions and Groups of the Standard International Trade Classification.

Valuation of Items of Trade

All values in overseas trade statistics are determined on a 'free on board (f.o.b.) port of shipment' basis. This means that all charges (in particular the cost of freight and insurance) incurred after the goods have been exported from the port of shipment are excluded. Only transport and service charges incurred, or usually incurred, prior to export are included in the determination of trade values.

The procedure adopted to value overseas imports and exports is as follows:

Imports. Up to 30 June 1976 the recorded value of goods imported was the 'value for duty' as laid down for Customs purposes, i.e. the sum of:

- (a) (i) the actual money price paid or to be paid for the goods by the Australian importer plus any special deduction, or
- (ii) the current domestic value of the goods, whichever was the higher; and
- (b) all charges payable or ordinarily payable for placing the goods free on board at the port of export.

In the case of goods consigned for sale in Australia the value for duty was the amount which would be the value for duty if the goods were, at the date of exportation, sold to an Australian importer instead of being consigned for sale in Australia.

'Current domestic value' was defined as 'the amount for which the seller of the goods to the purchaser in Australia was selling or would be prepared to sell for cash, at the date of exportation of those goods, the same quantity of identically similar goods to any and every purchaser in the country of export for consumption in that country'.

From 1 July 1976 a system of valuation based on the Brussels Definition of Value was introduced, the value for duty being based on the normal price, i.e. the price the goods would fetch at the time when the duty becomes payable on a sale in the open market between a buyer and a seller independent of each other. The goods are valued in the country of exportation, that is freight and insurance are excluded.

Exports. The recorded value of goods exported includes the cost of the outside packages and is determined as follows.

- (a) Goods sold to overseas buyers before export are valued at the Australian f.o.b. port of shipment equivalent of the actual price at which the goods were sold.
- (b) Goods shipped on consignment are valued at the Australian f.o.b. port of shipment equivalent of the price paid for similar goods of Australian origin in the principal markets of the country to which they are dispatched for sale.

The basis of valuation for exports to other Australian States is f.o.b., or its equivalent, at the point of final shipment. Statistics of imports from other Australian States are recorded in terms of landed cost.

Direction of Trade

The term *Country of Origin*, as used in recording the statistics of overseas trade, means the country of production; *Country of Destination* means the country to which goods were consigned at the time of export. In compiling statistics of Western Australia's interstate imports and exports, goods are classified according to the State or Territory from which or to which they were consigned.

Summary of Trade

Statistics of Western Australia's external trade are presented in the following series of tables. Particulars relate, in all cases, to the year ended 30 June. The figures shown for exports do not include ships' stores, details of which are given in a table near the end of this Part.

VALUE OF INTERSTATE AND OVERSEAS TRADE OF WESTERN AUSTRALIA
(\$'000)

Direction of trade	1975-76	1976-77	1977-78	1978-79	1979-80 r	1980-81
INTERSTATE (a) —						
Imports	1,418,726	1,641,545	1,828,510	2,044,447	2,337,808	2,841,110
Exports	290,733	305,836	355,151	446,208	635,388	812,996
Excess of —						
Imports over exports	1,127,993	1,335,709	1,473,360	1,598,238	1,702,420	2,028,114
OVERSEAS —						
Imports	637,439	829,411	937,350	1,161,164	1,449,694	1,663,378
Exports	2,117,898	2,596,107	2,588,954	2,820,134	3,854,047	3,791,114
Excess of —						
Exports over imports	1,480,460	1,766,697	1,651,605	1,658,970	2,404,353	2,127,736
TOTAL (a) —						
Imports	2,056,165	2,470,955	2,765,860	3,205,611	3,787,502	4,504,488
Exports	2,408,631	2,901,943	2,944,105	3,266,343	4,489,434	4,604,110
Excess of —						
Exports over imports	352,466	430,987	178,245	60,732	701,933	99,622

(a) Excludes interstate value of horses. Details are not available for publication.

IMPORTS AND EXPORTS

VALUE OF IMPORTS INTO AND EXPORTS FROM WESTERN AUSTRALIA
CLASSIFIED ACCORDING TO ORIGIN OR DESTINATION
(\$'000)

Origin or destination	Imports			Exports		
	1978-79	1979-80	1980-81	1978-79	1979-80	1980-81
INTERSTATE (a) —						
New South Wales (b)	838.141	909.066	1,052.845	194.016	281.438	341.963
Victoria	858.776	1,037.935	1,313.310	123.803	168.894	209.133
Queensland	73.419	86.975	90.630	24.680	42.490	45.077
South Australia	238.841	262.613	337.573	80.796	109.948	181.477
Tasmania	28.719	34.244	38.637	4.173	5.336	5.842
Northern Territory	6.550	6.974	8.116	18.740	27.281	29.506
Total, Interstate	2,044.447	2,337.808	2,841.110	446.208	635.388	812.996
OVERSEAS —						
Argentina, Republic of	146	160	205	38.595	70.502	40.998
Bahrain	21.370	30.654	8.545	29.360	37.234	30.560
Bangladesh	584	1,865	761	3.122	10.146	6.356
Belgium-Luxembourg	8.276	3.987	7.429	20.613	13.413	20.111
Brazil	166	609	3,367	1.956	2.463	7.662
Canada	72.885	30.024	41.810	24.978	27.061	26.816
China — excluding Taiwan Province	2.856	9.991	8.642	186.279	242.912	134.450
— Taiwan Province only	11.606	16.338	21.264	56.841	62.568	77.739
Christmas Island	4.668	6.030	8.676	3.433	3.308	3.767
Czechoslovakia	635	608	651	863	2.489	4.921
Egypt, Arab Republic of	15	9	8	16.255	34.816	81.349
Fiji	—	3	393	8.470	8.799	19.645
Finland	3.726	3.471	7.052	178	791	2.739
France	13.326	27.366	20.874	45.811	51.977	57.819
German Democratic Republic	150	358	172	1.019	5.817	5.250
Germany, Federal Republic of	73.441	58.795	62.970	105.320	134.314	86.383
Hong Kong	9.416	11.610	11.368	60.086	21.329	18.210
India	4.739	5.667	5.412	10.240	12.876	19.926
Indonesia	26.779	106.190	107.187	58.307	78.590	68.504
Iran, Islamic Republic of	11.593	15.459	32	17.837	132.725	76.909
Iraq	94.525	129.828	52.459	3.834	41.410	950
Italy	20.558	19.533	23.970	52.916	63.767	72.381
Ivory Coast	—	—	28	—	—	55.487
Japan	124.171	173.737	275.018	1,118.298	1,391.727	1,374.927
Korea, Republic of	3.358	4.491	9.961	49.486	80.604	95.832
Kuwait	89.597	192.743	177.511	21.302	25.993	52.291
Libyan Jamahiriya	—	—	—	4.614	17.792	23.254
Malaysia	7.954	10.688	27.100	51.648	49.486	57.012
Mexico	187	112	117	3.736	5.500	5.683
Nauru, Republic of	14.350	17.273	16.364	12	7	6
Netherlands	11.912	8.744	11.882	42.517	77.434	70.496
New Zealand	9.970	16.429	22.118	30.834	48.868	55.477
Norway	2.066	2.587	5.047	10.341	15.066	12.072
Papua New Guinea	1.090	1.342	6.249	4.163	2.892	2.584
Philippines, Republic of the	2.126	3.213	3.241	12.331	16.214	10.400
Poland	396	1,144	304	9.272	15.251	12.579
Qatar	1.197	—	212	4.498	6.216	8.813
Saudi Arabia	11.281	13.466	16.915	23.207	33.240	32.395
Singapore, Republic of	64.604	93.965	129.436	41.185	65.636	109.073
South Africa, Republic of	23.886	14.007	18.663	19.667	29.083	29.764
Spain	3.692	3.364	3.557	11.125	7.781	13.091
Sri Lanka	1.147	825	811	208	1,209	24.977
Sweden	6.463	6.713	9.700	11.058	11.462	4.968
Thailand	2.818	6.474	4.413	6.389	9.469	12.752
Union of Soviet Socialist Republics	114	53	30	67.161	136.551	93.249
United Arab Emirates	61.905	117.195	152.556	6.357	22.217	34.068
United Kingdom	81.237	77.986	92.521	49.466	83.887	76.013
United States of America	217.672	182.805	263.717	374.162	515.681	538.698
Yemen Arab Republic	—	—	—	10.700	39.183	30.591
Yemen, People's Democratic Republic of	—	—	—	15	1.442	6.932
Yugoslavia	383	299	534	2,010	7.522	9.387
Zambia	6	—	—	2.179	4.678	8.852
Total, Overseas (c)	1,161.164	1,449.683	1,663.378	2,820.134	3,854.092	3,791.114
GRAND TOTAL (a)(c)	3,205.611	3,787.491	4,504.488	3,266.343	4,489.480	4,604.110

(a) Excludes interstate value of horses. Details are not available for publication. (b) Includes the value of trade with the Australian Capital Territory. (c) Includes figures for 'Other countries' and 'Other' (Origin not known, Destination unknown, etc.).

VALUE OF TRADE OF WESTERN AUSTRALIA
SELECTED DIVISIONS: 1980-81
(\$'000)

Division	Description	Imports			Exports		
		Interstate	Overseas	Total	Interstate	Overseas	Total
00	Live animals, chiefly for food	(a) 8,385	—	(a) 8,385	(a) 377	104,073	(a) 104,451
01	Meat and meat preparations	17,283	138	17,421	4,279	155,255	159,534
02	Dairy products and eggs	26,170	1,506	27,676	n.p.	1,214	(b)
03	Fish, crustaceans and molluscs, and preparations thereof	5,885	12,954	18,839	10,134	79,817	89,950
04	Cereals and cereal preparations	28,537	1,453	29,991	1,168	489,825	490,993
05	Vegetables and fruit	61,169	6,249	67,418	6,207	16,250	22,457
07	Coffee, tea, cocoa, spices, and manufactures thereof	43,972	587	44,559	n.p.	55	(b)
08	Feeding stuff for animals (excluding unmilled cereals)	18,054	3,545	21,599	n.p.	7,779	(b)
11	Beverages	46,080	5,115	51,195	4,657	303	4,960
12	Tobacco and tobacco manufactures	34,542	1,043	35,584			
26	Textile fibres (other than wool tops) and their wastes (not manufactured into yarn or fabric)	n.p.	1,811	(b)			
27	Crude fertilisers and crude minerals (excluding coal, petroleum and precious stones)	983	53,396	54,379	1,902	55,123	57,025
28	Metalliferous ores and metal scrap	n.p.	698	(b)	159,731	1,162,394	1,322,125
33	Petroleum, petroleum products and related materials	n.p.	668,089	(b)	n.p.	89,857	(b)
54	Medicinal and pharmaceutical products	51,971	635	52,605	382	35	417
55	Essential oils and perfume materials: toilet, polishing and cleansing preparations	69,235	1,462	70,697	961	146	1,106
58	Artificial resins and plastic materials, and cellulose esters and ethers	41,509	12,417	53,926	2,372	474	2,846
62	Rubber manufactures, n.e.s.	47,905	26,326	74,231	1,152	52	1,204
64	Paper, paperboard, and articles of paper pulp, of paper or of paperboard	63,796	24,621	88,417	9,946	1,176	11,122
65	Textile yarn, fabrics, made-up articles, n.e.s. and related products	88,468	24,306	112,774	n.p.	932	(b)
66	Non-metallic mineral manufactures, n.e.s.	35,937	20,620	56,557	15,394	6,437	21,832
67	Iron and steel	231,721	79,148	310,869	15,256	42,423	57,679
68	Non-ferrous metals	51,075	1,790	52,866	7,332	6,724	14,056
71	Power generating machinery and equipment	28,874	53,604	82,478	4,792	1,644	6,435
72	Machinery specialised for particular industries	116,741	132,362	249,103	51,124	13,115	64,239
74	General industrial machinery and equipment, n.e.s. and machinery parts, n.e.s.	123,726	77,498	201,225	18,139	1,957	20,096
75	Office machines and automatic data processing equipment	45,976	6,798	52,774	2,431	466	2,897
76	Telecommunications and sound recording and reproducing apparatus and equipment	64,679	19,122	83,801	2,323	710	3,033
77	Electrical machinery, apparatus and appliances, n.e.s. and electrical parts thereof	146,408	26,464	172,872	3,543	1,823	5,366
78	Road vehicles (including air cushion vehicles)	338,258	128,703	466,960	n.p.	1,185	(b)
82	Furniture and parts thereof	16,043	5,882	21,925	15,532	386	15,918
84	Articles of apparel and clothing accessories	145,424	6,867	152,292	14,126	317	14,444
85	Footwear (excluding parts)	29,628	2,926	32,553	2,881	69	2,950
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	34,749	16,942	51,691	1,293	1,725	3,018
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s.: watches and clocks	28,383	3,901	32,284	542	163	705
TOTAL (c)		2,841,110	1,663,378	4,504,488	812,996	3,791,114	4,604,110
		(a)		(a)	(a)		(a)

(a) Excludes interstate value of horses. Details are not available for publication. (b) Owing to the exclusion of confidential details, a total value is not available. (c) Includes details not available for publication and divisions not shown separately.

VALUE OF OVERSEAS TRADE WITH SELECTED COUNTRIES BY
SELECTED DIVISIONS: 1980-81
(\$'000)

Division	Description	Imports				Exports			
		Japan	United States of America	Singapore	United Kingdom	Japan	United States of America	China, excl Taiwan Province	United Kingdom
01	Meat and meat preparations	1	2	3	123	11,374	58,880	33	2,403
03	Fish, crustaceans and molluscs, and preparations thereof	3,095	820	391	626	29,755	44,425	3	32
04	Cereals and cereal preparations	56	233	70	290	125,805	—	64,208	369
05	Vegetables and fruit	61	670	47	231	481	—	—	1,293
08	Feeding stuff for animals (excluding unmilled cereals)	1	1,574	—	—	1,116	14	—	20
11	Beverages	27	158	9	2,639	—	4	—	2
24	Cork and wood	—	665	260	1	—	346	—	2,649
26	Textile fibres (other than wool tops) and their wastes (not manufactured into yarn or fabric)	124	302	3	490	114,931	13,628	11,790	8,044
27	Crude fertilisers and crude minerals (excluding coal, petroleum and precious stones)	107	8,167	54	211	36,970	679	—	344
28	Metalliferous ores and metal scrap	35	12	278	5	827,842	39,992	45,529	18,513
29	Crude animal and vegetable materials, n.e.s.	233	60	176	29	456	343	—	703
33	Petroleum, petroleum products and related materials	11	1,097	115,791	637	—	1	—	—
51	Organic chemicals	2,256	637	7	8,466	—	—	—	—
52	Inorganic chemicals	370	556	149	2,008	—	2	—	—
56	Fertilisers, manufactured	50	12,289	—	—	—	—	—	—
58	Artificial resins and plastic materials and cellulose esters and ethers	1,127	1,826	2,663	2,784	—	—	—	—
59	Chemical materials and products, n.e.s.	1,225	3,309	70	1,824	241	233	—	3
62	Rubber manufactures, n.e.s.	15,123	2,881	138	2,330	—	—	—	24
64	Paper, paperboard, and articles of paper pulp, of paper or of paperboard	1,977	769	52	535	—	1	—	—
65	Textile yarn, fabrics, made-up articles, n.e.s. and related products	2,819	2,088	1,350	1,878	—	33	—	62
66	Non-metallic mineral manufactures, n.e.s.	5,485	1,139	42	2,408	2,136	169	—	164
67	Iron and steel	62,368	4,648	511	2,022	5,306	2,197	10,609	433
68	Non-ferrous metals	86	218	78	785	—	1,830	—	3,967
69	Manufactures of metal, n.e.s.	2,508	10,065	346	3,429	262	4,830	6	647
71	Power generating machinery and equipment	11,829	18,209	59	10,635	4	80	1	896
72	Machinery specialised for particular industries	13,703	78,628	241	7,692	—	956	—	260
73	Metalworking machinery	1,484	731	20	721	—	10	—	147
74	General industrial machinery and equipment, n.e.s. and machine parts, n.e.s.	9,703	32,018	618	11,336	20	254	—	85
75	Office machines and automatic data processing equipment	879	5,116	—	177	3	156	—	197
76	Telecommunications and sound recording and reproducing apparatus and equipment	13,603	1,815	673	647	95	81	—	24
77	Electrical machinery, apparatus and appliances, n.e.s. and electrical parts	8,231	6,505	270	3,047	56	25	—	19
78	Road vehicles (including air cushion vehicles)	91,263	24,669	124	2,020	3	17	1	37
79	Other transport equipment	1,782	3,551	84	639	—	91	—	16
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	1,930	7,859	110	3,274	6	338	—	119
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	557	1,265	92	338	—	10	—	2
TOTAL (a)		275,018	263,717	129,436	92,521	1,374,927	538,698	134,450	76,013

(a) Includes details not available for publication and divisions not shown separately.

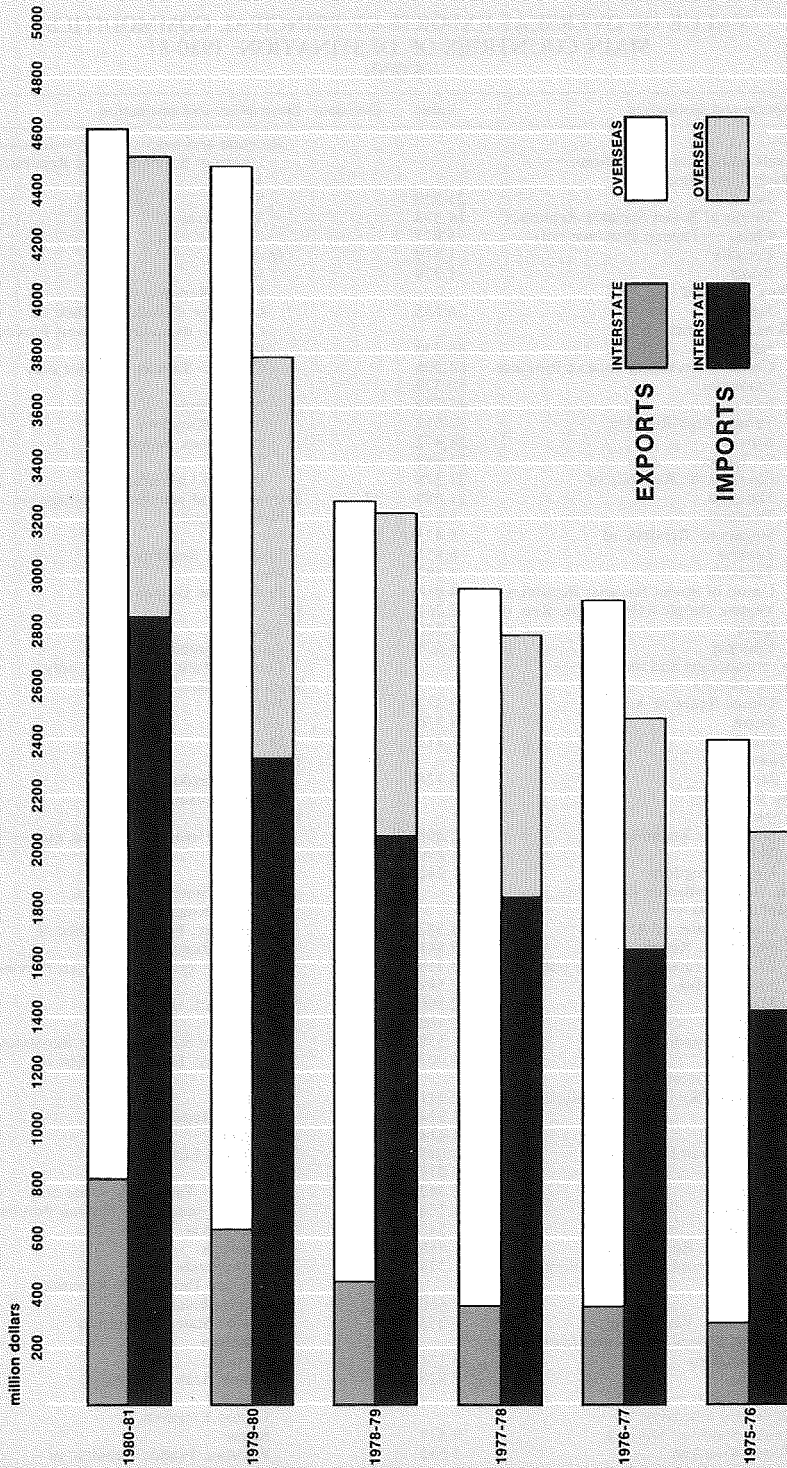
In the table below, details are given of the value of the principal commodities imported from and exported to other Australian States and Territories.

VALUE OF INTERSTATE IMPORTS AND EXPORTS — SELECTED DIVISIONS
(\$'000)

Division	Description	Imports			Exports		
		1978-79	1979-80	1980-81	1978-79	1979-80	1980-81
00	Live animals, chiefly for food (a)	7,218	7,948	8,385	683	591	377
01	Meat and meat preparations	15,259	16,230	17,283	1,440	2,677	4,279
02	Dairy products and birds' eggs	21,618	24,764	26,170	n.p.	n.p.	n.p.
03	Fish, crustaceans and molluscs, and preparations thereof	3,365	4,531	5,885	7,252	10,558	10,134
04	Cereal grains and cereal preparations	21,832	23,802	28,537	789	1,143	1,168
05	Vegetables and fruit	43,015	51,995	61,169	2,818	2,923	6,207
06	Sugar, sugar preparations and honey	23,391	24,451	24,761	n.p.	n.p.	n.p.
07	Coffee, tea, cocoa, spices and manufactures thereof	33,541	34,341	43,972	n.p.	n.p.	n.p.
08	Feeding stuff for animals (excluding unmilled cereals)	14,773	15,663	18,054	n.p.	n.p.	n.p.
11	Beverages	33,829	40,603	46,080	3,835	3,656	4,657
12	Tobacco and tobacco manufactures	31,870	29,210	34,542			
24	Cork and wood	321	894	1,481	4,453	5,177	5,281
28	Metalliferous ores and metal scrap	n.p.	n.p.	n.p.	76,820	109,317	159,731
51	Organic chemicals	6,257	5,436	6,752	n.p.	n.p.	n.p.
52	Inorganic chemicals	8,409	12,052	13,056	32,833	14,341	n.p.
53	Dyeing, tanning and colouring materials	12,083	13,963	14,364	843	793	625
54	Medicinal and pharmaceutical products	42,590	48,168	51,971	n.p.	n.p.	382
55	Essential oils and perfume materials; toilet, polishing and cleansing preparations	47,740	56,018	69,235	550	765	961
58	Artificial resins and plastic materials, and cellulose esters and ethers	30,429	36,086	41,509	n.p.	n.p.	2,372
62	Rubber manufactures, n.e.s.	38,463	42,685	47,905	191	189	1,152
63	Cork and wood manufactures (excluding furniture)	10,411	13,125	13,575	n.p.	n.p.	n.p.
64	Paper, paperboard, and articles of paper pulp, of paper or of paperboard	46,976	52,743	63,796	5,207	6,014	9,946
65	Textile yarn, fabrics, made-up articles n.e.s. and related products	66,823	76,464	88,468	n.p.	n.p.	n.p.
66	Non-metallic mineral manufactures, n.e.s.	26,148	29,969	35,937	13,387	12,135	15,394
67	Iron and steel	126,782	177,470	231,721	11,791	15,230	15,256
68	Non-ferrous metals	29,048	44,718	51,075	n.p.	n.p.	7,332
71	Power generating machinery and equipment	28,064	26,199	28,874	3,630	4,395	4,792
72	Machinery specialised for particular industries	70,544	99,557	116,741	46,226	46,946	51,124
73	Metalworking machinery	5,241	6,938	8,570	2,133	1,782	2,538
74	General industrial machinery and equipment, n.e.s. and machine parts, n.e.s.	87,425	103,187	123,726	12,069	17,417	18,139
75	Office machines and automatic data processing equipment	32,361	36,553	45,976	1,995	1,357	2,431
76	Telecommunications and sound recording and reproducing apparatus and equipment	58,082	50,107	64,679	1,125	1,243	2,323
77	Electrical machinery, apparatus and appliances, n.e.s. and electrical parts thereof	107,144	126,184	146,408	2,830	9,950	3,543
78	Road vehicles (including air cushion vehicles)	324,651	317,632	338,258			
81	Sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.	10,584	13,154	15,045	n.p.	n.p.	n.p.
82	Furniture and parts thereof	12,055	11,811	16,043	11,781	13,822	15,532
84	Articles of apparel and clothing accessories	126,777	134,614	145,424	9,824	16,518	14,126
85	Footwear	24,122	24,323	29,628	2,396	2,867	2,881
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	22,834	24,482	34,749	480	542	1,293
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	19,334	21,185	28,383	191	140	542
TOTAL (a) (b)		2,044,447	2,337,808	2,841,110	446,208	635,388	812,996

(a) Excludes the value of horses; details are not available for publication. (b) Includes details not available for publication and divisions not shown separately.

Imports and Exports, 1975-76 to 1980-81



EXPORTS
VALUE OF OVERSEAS EXPORTS OF PRINCIPAL COMMODITIES
MAIN COUNTRIES OF DESTINATION: 1980-81
(\$'000)

Division	Description and destination	Value	Division	Description and destination	Value
	Food —			Ilmenite and leucoxene (b) — (continued) —	
04	Cereals and cereal preparations —			Union of Soviet Socialist Republics	3,050
	Barley, unmilled —			Japan	1,443
	Japan	21,720		Spain	1,198
	Union of Soviet Socialist Republics	14,393		Yugoslavia	1,183
	China — Taiwan Province only	5,877		France	1,161
	Ecuador	1,510		Iron —	
	Brazil	1,379		Japan	810,073
	Oats, unmilled —			Korea, Republic of	65,541
	Japan	6,155		Germany, Federal Republic of	46,140
	Wheat, unmilled —			China — excluding Taiwan Province	45,529
	Japan	88,235		France	23,666
	China — excluding Taiwan Province	64,206		China — Taiwan Province only	23,361
	Indonesia	59,329		Italy	18,154
	Iran	47,754		Netherlands	10,102
	Yemen Arab Republic	30,017		United Kingdom	8,800
	Kuwait	28,472		Philippines, Republic of	7,523
	Sri Lanka	22,440		Spain	6,721
	Egypt, Arab Republic of	21,278		Belgium-Luxembourg	2,584
	Malaysia	21,089	33	Petroleum and petroleum products —	
	Thailand	8,650		New Zealand	52,190
	Singapore, Republic of	8,473		Fiji	18,903
	Zambia	6,851		Singapore, Republic of	11,953
	Tanzania	4,592		Malaysia	4,905
	Union of Soviet Socialist Republics	4,010		Papua-New Guinea	1,422
	Yemen, People's Democratic Rep. of	2,262	27	Salt —	
	Qatar	1,948		Japan	31,934
	Ethiopia	1,621		Korea, Republic of	6,580
03	Fish, crustaceans and molluscs —			China — Taiwan Province only	4,821
	Rock lobsters —		21	Skins and hides —	
	United States of America	43,373		France	6,197
	Japan	16,370		Italy	4,625
	France	1,413		Hungary	1,243
	Prawns —		24	Timber —	
	Japan	13,128		United Kingdom	2,649
05	Fruit, fresh —			Belgium-Luxembourg	2,422
	Apples —		26	Wool —	
	Singapore, Republic of	2,308		Degreased (washed, scoured, etc) —	
	Malaysia	1,490		Japan	31,347
	United Kingdom	1,242		Italy	19,350
01	Meat, fresh, chilled or frozen —			United States of America	9,402
	Beef and veal —			United Kingdom	5,243
	United States of America	58,582		Germany, Federal Republic of	5,182
	Singapore, Republic of	5,541		Korea, Republic of	4,981
	China — Taiwan Province only	3,718		China — excluding Taiwan Province	4,166
	Saudi Arabia	3,584		Greece	1,843
	Malaysia	2,500		Greasy (incl. slip) —	
	Japan	2,108		Japan	83,615
	United Kingdom	1,559		Union of Soviet Socialist Republics	39,250
	Canada	1,303		Germany, Federal Republic of	31,110
	Mutton and lamb —			Italy	23,081
	Union of Soviet Socialist Republics	22,411		France	18,718
	Japan	7,524		Korea, Republic of	12,984
	Iran	4,414		Poland	11,993
	United Arab Emirates	4,085		Belgium-Luxembourg	11,928
	Syria	3,271		India	9,931
	Greece	2,342		China — Taiwan Province only	8,683
	Malaysia	1,754		— excluding Taiwan Province	7,624
	Kuwait	1,543		Yugoslavia	7,446
	Singapore, Republic of	1,448		Malaysia	6,139
	Yemen, People's Democratic Rep. of	1,374		Netherlands	5,880
	Other (a) —			German Democratic Republic	4,777
	Japan	1,660		Czechoslovakia	4,305
	Singapore, Republic of	1,253		United States of America	4,169
97, 99	Gold, excluding ores and concentrates —			Romania	3,774
	United Kingdom	23,131		Mexico	3,008
	Hong Kong	7,926		Egypt, Arab Republic of	2,972
28	Ores, metalliferous —			Turkey	2,711
	Ilmenite and leucoxene (b) —			United Kingdom	2,670
	United States of America	9,527		Spain	1,722
	United Kingdom	3,652		Pakistan, Islamic Republic of	1,395

(a) Comprises pigmeat, edible offals, poultry, rabbits, goat, buffalo and kangaroo meats.

(b) Excludes beneficiated ilmenite.

AVERAGE EXPORT VALUES

The following table shows the annual average export values, during the six years ended 30 June 1981, of a number of Western Australia's principal overseas export commodities. The figures are based on the value f.o.b., or its equivalent, at the port of final shipment.

ANNUAL AVERAGE OVERSEAS EXPORT VALUES OF SPECIFIED COMMODITIES (\$)

Description	Unit	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Cattle hides	kg	0.39	0.70	0.74	1.32	1.49	0.76
Cereals, unmilled —							
Barley	tonne	108.65	111.34	91.23	93.32	108.62	136.17
Oats	tonne	92.59	91.14	85.13	87.10	85.72	132.29
Wheat	tonne	116.89	105.10	92.52	116.53	146.45	160.32
Crustaceans, fresh, chilled or frozen —							
Prawns and shrimps	kg	5.12	6.67	7.37	9.23	9.61	8.14
Rock lobster tails	kg	8.88	11.60	12.22	12.24	13.96	14.86
Meat, fresh, chilled or frozen —							
Beef	kg	0.91	1.00	1.12	1.73	2.26	2.15
Lamb	kg	0.81	0.89	1.02	1.24	1.11	1.60
Mutton	kg	0.61	0.78	0.92	1.16	1.17	1.24
Ores, metalliferous —							
Ilmenite (a)	tonne	13.64	15.62	16.39	16.55	17.99	21.25
Iron	tonne	9.54	10.85	12.01	11.86	13.37	14.69
Rutile	tonne	170.60	213.89	197.32	184.11	228.07	279.82
Zirconium	tonne	150.64	113.33	75.18	56.96	59.44	69.20
Petroleum and related products —							
Automotive spirit	'000 litres	86.01	105.85	103.93	134.26	233.47	257.40
Aviation kerosene	'000 litres	85.70	100.83	104.35	109.71	195.48	261.17
Lubricating oil	'000 litres	132.37	148.68	155.09	164.66	263.77	347.80
Pig and cast iron (including spiegeleisen)	tonne	68.02	74.27	75.51	90.61	125.04	119.81
Salt	tonne	5.53	6.88	7.09	6.99	7.92	10.85
Sheep and lambs, live	each	11.04	14.99	23.41	23.61	28.58	30.06
Wool —							
Degreased	kg	1.87	2.68	2.93	3.10	3.75	4.31
Greasy (including stipe)	kg	1.48	1.88	1.96	2.08	2.54	2.70

(a) Excludes beneficiated ilmenite.

SHIPS' STORES

The following table shows the quantity and value of ships' stores loaded on board vessels at Western Australian ports during the years 1978-79 to 1980-81. The value of ships' stores is excluded from all tables appearing elsewhere in this Part.

EXPORTS IN THE FORM OF SHIPS' STORES (a)

Description	Unit	1978-79		1979-80		1980-81	
		Quantity	Value	Quantity	Value	Quantity	Value
Beverages, alcoholic	'000 litres	1,205	\$'000 1,206	1,106	\$'000 1,874	1,052	\$'000 1,879
Foodstuffs —							
Fresh, chilled or frozen —							
Eggs in shell	'000 doz.	124	169	208	312	}	7,578
Fish	tonne	125	361	270	960		
Fruit and vegetables	..	..	1,033	..	1,369		
Meat	tonne	671	1,507	1,022	2,816		
All other foodstuffs	..	..	458	..	3,433		
Fuel for ships and aircraft (bunker oil, etc.)	..	..	61,684	..	104,881	..	120,793
Lubricants	..	..	1,622	..	1,924	..	1,999
All other ships' stores (b)	..	..	4,572	..	8,607	..	12,036
Total	..	..	72,611	..	126,176	..	144,285

(a) Includes interstate ships' stores valued at \$2,448,018 in 1978-79, \$2,309,776 in 1979-80 and \$2,854,379 in 1980-81. When the value of overseas ships' stores recorded in any one entry is less than \$250, the stores concerned are not allocated according to commodity, but are included in the item *All other ships' stores*. (b) See footnote (a).

OVERSEAS IMPORTS AND EXPORTS

The following table shows the total value of Australia's overseas imports and exports, together with the proportion handled at Western Australian ports, during each of the years 1975-76 to 1980-81.

OVERSEAS TRADE OF AUSTRALIA — TOTAL VALUE AND PROPORTION
HANDLED AT WESTERN AUSTRALIAN PORTS

Year	Value of Australian trade (\$'000)			Proportion handled at Western Australian ports (per cent)		
	Imports	Exports	Total	Imports	Exports	Total
1975-76	8,240.593	9,639.583	17,880.176	7.74	21.97	15.41
1976-77	10,410.645	11,651.591	22,062.236	7.97	22.28	15.53
1977-78	11,166.553	12,269.530	23,436.082	8.39	21.10	15.05
1978-79	13,752.254	14,241.167	27,993.421	8.44	19.80	14.22
1979-80	r 16,217.505	r 18,870.079	r 35,087.584	8.94	20.42	15.12
1980-81	18,964.266	19,169.243	38,133.509	8.77	19.78	14.30

CUSTOMS AND EXCISE

The Customs Tariff

The first Commonwealth Customs Tariff was introduced on 8 October 1901, from which date uniform duties came into effect throughout Australia. The Australian Customs Tariff has been developed in conformity with the policy of protecting economic and efficient Australian industries and of granting preferential treatment to imports from certain countries. Duties are imposed on some goods, generally of a luxury nature, for revenue purposes. Customs collections are a major source of revenue, but in its protective character the tariff has an important influence on the Australian economy.

The Australian Customs Tariff currently in use was introduced on 1 July 1965. The nomenclature used in the Tariff is that of the Convention on Nomenclature for the Classification of Goods in Customs Tariffs, an international agreement signed at Brussels on 15 December 1950. The system of naming established by the Convention is known as the 'Customs Co-operation Council Nomenclature' (previously the Brussels Tariff Nomenclature).

Chapter IX—continued

Part 2 — Internal Trade

CENSUSES OF WHOLESALE, RETAIL AND SELECTED SERVICE ESTABLISHMENTS

Statistics of internal trade in Western Australia are derived mainly from the programme of integrated economic censuses which was introduced in 1968-69 and is described in more detail in the introduction to Chapter VIII.

Wholesale and retail trade comprises Division F of the Australian Standard Industrial Classification (ASIC) which is also described in Chapter VIII. Wholesale trade is described in ASIC as the re-sale (as agent or principal) of new or used goods to retailers or other wholesalers, or to institutional, government, professional or business users. Retail trade is described as the re-sale of new or used goods to final consumers for personal or household consumption. The selected service industries surveyed in the programme are included in Division L of ASIC, 'Entertainment, Recreation, Restaurants, Hotels and Personal Services'.

CENSUS OF WHOLESALE ESTABLISHMENTS

The first Census of Wholesale Establishments was conducted in 1968-69 and detailed statistics for Western Australia were published in the bulletin *Economic Censuses 1968-69: Wholesale Establishments (Final), Western Australia*. Bulletins relating to each of the other States and Territories and Australia as a whole were also published. The data items were classified variously to each industry class within Sub-division 46-47 'Wholesale Trade' of ASIC; to broad types of operation (i.e. primary produce dealers or agents, wholesale merchants, manufacturers' sales branches holding stocks, commission agents or brokers, petroleum distributors, or repairers and lessors of machinery and equipment); to area (i.e. local government area and statistical division) and to size of establishment, based on wholesale sales.

A summary of the data of the 1968-69 Wholesale Census appeared in the *Western Australian Year Book*, issues No. 11 — 1972 to No. 15 — 1976.

CENSUSES OF RETAIL AND SELECTED SERVICE ESTABLISHMENTS

Five retail censuses had been conducted prior to the inclusion of a Census of Retail and Selected Service Establishments in the system of integrated economic censuses in 1968-69. These earlier censuses related to the years 1947-48, 1948-49, 1952-53, 1956-57 and 1961-62 and covered (i) the retail trading activities of all establishments selling to the general public from fixed premises such as shops, rooms, kiosks and yards and (ii) the service activities of establishments such as motor repair workshops, hairdressers, boot repairers, cafes and restaurants. Licensed clubs and laundries and dry cleaners were included in collections supplementary to retail censuses from 1952-53 onwards and motion picture theatres were included in collections supplementary to the 1956-57 and 1961-62 Retail Censuses. Statistics from these censuses were published in bulletins for each State and Territory and for Australia as a whole. The censuses were also used to provide a framework for conducting quarterly sample surveys of retail sales.

Following the first integrated Census of Retail and Selected Service Establishments for the year 1968-69, two further integrated censuses have been conducted for the years 1973-74 and 1979-80.

From 1968-69 the censuses have been based upon definitions from ASIC. They differ from earlier censuses, being restricted to establishments primarily engaged in retailing or the selected services and excluded the retailing or service activities of other types of establishments (e.g. wholesalers, manufacturers). The use of ASIC also involved another change in that all the activities of each establishment included in the census were measured, including non-retail or non-service activities, whereas in previous censuses only the retail or service activities were included. For example, for a retail establishment also engaged in wholesaling, all employees are included in the integrated censuses, whereas previously the employees engaged in wholesaling have been excluded.

The classification of census units to industry for the 1979-80 retail census is based upon the 1978 edition of ASIC. The previous two censuses were based upon the 1969 preliminary edition which had been in use since then. A publication describing the differences between the two ASIC editions is available on request from the ABS, and is titled *Key Between the 1978 and 1969 Editions of ASIC* (Catalogue No. 1209.0). In general, the impact of the change in industrial classification for the retail and selected services industries included in the census is minimal.

The scope of the 1979-80 Census included all establishments classified to 'Retail Trade' — Sub-division 48 of ASIC, and in addition the establishments from selected industry classes in Division L: 'Recreation, Personal and Other Services'. The selected classes were 9133 Motion Picture Theatres; 9231 Cafes and Restaurants; 9232 Hotels, etc. (mainly drinking places); 9233 Accommodation; 9241 Licensed Bowling Clubs; 9242 Licensed Golf Clubs; 9243 Licensed Clubs n.e.c.; 9340 Laundries and Dry-Cleaners; 9351 Mens Hairdressers; and 9352 Womens Hairdressing and Beauty Salons.

The full range of census data was collected from all retail and selected service establishments owned by multi-establishment enterprises and single establishment retail and selected service enterprises with turnover of \$50,000 or more (except for establishments classified to the ASIC classes, 9232 Hotels, etc. (mainly drinking places) and 9233 Accommodation, for which the full range was collected irrespective of value of turnover). For those single establishment retail and selected service enterprises of less than \$50,000 turnover, only employment, wages and salaries, turnover and floorspace were collected.

Detailed results (including scope and coverage) for each census have been published for each State and Territory and for Australia as a whole.

Results of the 1979-80 Census were published in six parts — *Census of Retail and Selected Service Establishments, Western Australia 1979-80: Details of Operations by Industry Class* (Catalogue No. 8622.5); *Industry and Commodity Details by Area* (Catalogue No. 8623.5); *Hotels and Accommodation* (Catalogue No. 8624.5); *Commodity Sales and Service Takings* (Catalogue No. 8625.5); *Industry and Commodity Details by Size of Establishment* (Catalogue No. 8626.5); and *Floorspace, Perth Statistical Division* (Catalogue No. 8605.5).

The following tables show final figures by industry class for major variables collected in the Census of Retail and Selected Service Establishments, 1979-80.

RETAIL ESTABLISHMENTS AND SELECTED SERVICE ESTABLISHMENTS (a)
DETAILS OF OPERATIONS BY INDUSTRY CLASS: 1979-80

ASIC class description	Establishments at 30 June	Persons employed at 30 June (b)	Wages and salaries (c)	Retail sales	Turnover	Stocks at 30 June	Total floor space
	No.	No.	\$'000	\$'000	\$'000	\$'000	sq metres
Retail establishments —							
Departments and general stores —							
Department stores	39	8,025	55,665	311,247	330,740	54,769	318,048
General stores	43	549	4,427	31,725	35,887	5,549	37,553
Total, Department and general stores	82	8,574	60,092	342,972	366,627	60,318	355,601
Clothing, fabrics and furniture stores —							
Men's and boys' wear stores	191	839	5,724	45,944	46,710	10,189	31,059
Women's and girls' wear stores	567	2,301	12,997	99,419	99,758	19,010	72,731
Footwear stores	199	1,205	7,306	49,061	49,130	11,142	33,773
Shoe repairers	28	64	438	34	1,380	78	649
Fabrics and household textile stores	154	852	4,477	31,826	32,183	7,366	29,787
Floor covering stores	92	487	3,809	45,205	46,663	7,798	43,293
Furniture stores	156	718	5,290	53,933	54,777	8,863	81,294
Total, Clothing, fabrics and furniture stores	1,387	6,466	40,041	325,421	330,602	64,445	292,586
Household appliances and hardware stores —							
Domestic hardware stores	102	303	1,208	10,296	12,043	2,784	13,156
Watchmakers and jewellers	179	899	5,562	36,553	40,084	8,991	13,584
Music stores	115	328	1,831	21,563	22,133	4,112	11,911
Household appliance stores	259	1,423	12,450	146,757	158,483	20,814	80,683
Electric appliance repairers n.e.c.	74	406	2,515	1,490	9,538	767	11,979
Total, Household appliances and hardware stores	729	3,359	23,566	216,659	242,281	37,467	131,313
Motor vehicle dealers, petrol and tyre retailers —							
New motor vehicle dealers	800	7,532	64,931	591,147	980,052	118,331	..
Used motor vehicle dealers	260	1,131	8,858	133,030	154,908	17,145	..
Service stations (d)	771	3,821	19,009	270,706	309,673	11,340	..
Smash repairers	313	1,894	13,796	398	49,191	1,174	..
Motor cycle dealers	68	276	1,653	18,633	22,007	4,102	..
Boat and caravan dealers	98	507	3,209	38,809	44,528	8,644	..
Tyre and battery retailers	172	801	6,665	53,838	58,713	6,670	..
Total, Motor vehicle dealers, petrol and tyre retailers	2,482	15,962	118,121	1,106,561	1,619,073	167,406	..
Food stores —							
Grocers, confectioners and tobacconists	1,311	15,761	73,701	868,748	885,730	70,390	529,202
Butchers	538	1,728	9,128	95,560	96,742	1,165	55,357
Fruit and vegetable stores	226	932	2,414	31,695	31,833	735	23,653
Liquor stores	198	826	4,335	89,324	90,025	7,746	43,669
Bread and cake stores	80	414	1,908	9,413	9,696	232	9,351
Fish shops, take-away food and milk bars	811	4,928	14,715	97,008	103,183	2,675	84,189
Total, Food stores	3,164	24,589	106,201	1,191,747	1,217,209	82,944	745,421
Other retailers —							
Pharmacies	416	2,108	13,066	88,511	92,960	14,383	52,272
Photographic equipment stores	48	176	1,320	9,459	11,486	1,856	4,024
Sports and toy stores	215	676	2,867	30,330	32,339	7,795	35,163
Newsagents, stationers and booksellers	481	1,744	6,072	74,895	78,155	10,073	53,043
Second hand goods dealers	134	301	1,039	11,017	11,220	2,253	20,727
Nursery men and florists (e)	132	602	2,320	17,327	17,791	1,762	26,720
Retailing n.e.c.	124	349	1,408	10,395	11,553	2,078	13,152
Total, Other retailers	1,550	5,956	28,092	241,935	255,505	40,201	205,101
TOTAL, RETAIL ESTABLISHMENTS	9,394	64,906	376,112	3,425,294	4,031,296	452,781	1,730,022

**RETAIL ESTABLISHMENTS AND SELECTED SERVICE ESTABLISHMENTS (a)
DETAILS OF OPERATIONS BY INDUSTRY CLASS: 1979-80 — continued**

ASIC class description	Establish- ments at 30 June	Persons employed at 30 June (b)	Wages and salaries (c)	Retail sales	Turnover	Stocks at 30 June	Total floor space
	No.	No.	\$'000	\$'000	\$'000	\$'000	sq metres
Selected service establishments —							
Motion picture theatres	97	951	4,404	3,396	18,976	158	..
Restaurants, hotels and accommodation —							
Cafes and restaurants	490	5,243	31,108	15,312	100,416	2,367	..
Hotels, etc. (mainly drinking places)	556	8,029	48,927	208,616	250,353	10,245	..
Accommodation	417	3,805	22,799	9,326	74,120	1,027	..
Total, Restaurants, hotels and accommodation	1,463	17,077	102,834	233,253	424,889	13,639	..
Licensed clubs —							
Licensed bowling clubs	87	408	3,033	10,991	12,314	799	..
Licensed golf clubs	40	360	2,671	4,240	8,280	298	..
Licensed clubs n.e.c.	156	1,237	8,131	29,023	37,737	1,857	..
Total, Licensed clubs	283	2,005	13,835	44,253	58,331	2,954	..
Laundries and dry-cleaners	109	942	6,516	86	16,763	322	..
Hairdressers, beauty salons —							
Men's hairdressers	25	103	497	114	1,332	21	..
Women's hairdressing and beauty salons	200	1,220	7,663	1,289	16,531	566	..
Total, Hairdressers, beauty salons	225	1,323	8,160	1,403	17,863	587	..
TOTAL, SELECTED SERVICE ESTABLISHMENTS	2,177	22,298	135,749	282,391	536,822	17,661	..
TOTAL, RETAIL AND SELECTED SERVICES ESTABLISHMENTS	11,571	87,204	511,861	3,707,685	4,568,118	470,442	..

(a) Excludes (except for ASIC classes 9232 and 9233) all single establishment retail and selected service enterprises with turnover of less than \$50,000 and all bread and milk vendors. (b) Includes working proprietors. (c) Excludes drawings by working proprietors. (d) The retail sales and turnover figures for this industry do not reflect sales of petrol on commission. (e) The definition of floorspace could not be strictly applied for nurseries (ASIC class 4896) and therefore the figures should be used as a guide only. In general, the floorspace for nurseries includes both inside and outside selling areas but the treatment of outside growing areas may vary.

**RETAIL SINGLE ESTABLISHMENT ENTERPRISES AND SELECTED SERVICE
SINGLE ESTABLISHMENT ENTERPRISES (a) WITH TURNOVER LESS THAN \$50,000
DETAILS OF OPERATIONS BY INDUSTRY CLASS: 1979-80**

ASIC class description	Establish- ments at 30 June	Persons employed at 30 June (b)	Wages and salaries (c)	Turnover	Total floor space
	No.	No.	\$'000	\$'000	sq metres
Retail establishments —					
Department and general stores —					
General stores	6	9	8	148	611
Total, Department and general stores	6	9	8	148	611
Clothing, fabrics and furniture stores —					
Men's and boys' wear stores	78	125	139	1,726	3,757
Women's and girls' wear stores	203	344	372	4,766	10,325
Footwear stores	21	n.p.	n.p.	n.p.	n.p.
Shoe repairers	50	67	15	842	1,498
Fabrics and household textile stores	83	155	173	1,999	4,812
Floor coverings stores	3	n.p.	n.p.	n.p.	n.p.
Furniture stores	22	41	21	648	2,686
Total, Clothing, fabrics and furniture stores	460	771	745	10,636	24,336
Household appliances and hardware stores —					
Domestic hardware stores	69	135	124	1,817	4,113
Watchmakers and jewellers	81	139	94	1,600	2,985
Music stores	27	47	34	600	1,374
Household appliance stores	48	88	70	1,082	3,215
Electric appliance repairers n.e.c.	106	186	121	2,226	5,318
Total, Household appliance and hardware stores	331	595	443	7,326	17,005
Motor vehicle dealers, petrol and tyre retailers —					
New motor vehicle dealers	347	633	660	9,167	..
Used motor vehicle dealers	25	n.p.	n.p.	n.p.	..
Service stations (d)	55	143	246	1,412	..
Smash repairers	239	480	752	6,471	..
Motor cycle dealers	17	31	28	408	..
Boat and caravan dealers	35	68	53	732	..
Tyre and battery retailers	8	n.p.	n.p.	n.p.	..
Total, Motor vehicle dealers, petrol and tyre retailers	726	1,425	1,838	18,902	..

**RETAIL SINGLE ESTABLISHMENT ENTERPRISES AND SELECTED SERVICE
SINGLE ESTABLISHMENT ENTERPRISES (a) WITH TURNOVER LESS THAN \$50,000
DETAILS OF OPERATIONS BY INDUSTRY CLASS: 1979-80 — continued**

ASIC class description	Establish- ments at 30 June	Persons employed at 30 June (b)	Wages and salaries (c)	Turnover	Total floor space
	No.	No.	\$'000	\$'000	sq metres
Retail establishments — continued					
Food stores —					
Grocers, confectioners and tobacconists	244	444	232	6,368	12,741
Butchers	25	45	32	798	1,859
Fruit and vegetable stores	42	87	48	1,055	1,811
Bread and cake stores	13	29	49	368	986
Fish shops, take-away food and milk bars	524	996	1,141	11,704	27,010
Total, Food stores	848	1,601	1,503	20,293	44,407
Other retailers —					
Pharmacies	16	27	42	362	763
Photographic equipment stores	12	20	3	249	376
Sports and toy stores	104	173	49	2,049	5,639
Newsagents, stationers and booksellers	108	165	123	2,558	6,189
Secondhand goods dealers	198	257	129	3,293	18,311
Nurserymen and florists (e)	178	330	308	3,834	14,998
Retailers n.e.c.	212	370	238	3,835	12,839
Total, Other retailers	828	1,342	892	16,180	59,115
TOTAL, RETAIL ESTABLISHMENTS	3,199	5,743	5,429	73,485	145,474
Selected service establishments —					
Motion picture theatres	14	41	50	244	..
Cafes and restaurants	170	552	670	4,456	..
Licensed clubs —					
Licensed bowling clubs	16	15	57	464	..
Licensed golf clubs	28	44	53	719	..
Licensed clubs n.e.c.	16	23	79	545	..
Total, Licensed clubs	60	82	190	1,728	..
Laundries and drycleaners	103	207	195	1,705	..
Hairdressers, beauty salons —					
Men's hairdressing	170	335	656	3,302	..
Women's hairdressing and beauty salons	397	1,095	3,108	8,588	..
Total, Hairdressers, beauty salons	567	1,430	3,764	11,890	..
TOTAL, SELECTED SERVICE ESTABLISHMENTS	914	2,312	4,869	20,023	..
TOTAL, RETAIL AND SELECTED SERVICE ESTABLISHMENTS	4,113	8,055	10,298	93,508	..

(a) Excludes ASIC classes 9232 Hotels, etc. (mainly drinking places), 9233 Accommodation, 4878 Bread vendors and 4879 Milk vendors. (b) Includes working proprietors. (c) Excludes drawings by working proprietors. (d) The turnover figure for this industry does not reflect sales of petrol on commission. (e) The definition of floorspace could not be strictly applied for nurseries (ASIC class 4896) and therefore the figures should be used as a guide only. In general, the floorspace for nurseries includes both inside and outside selling areas but the treatment of outside growing areas may vary.

Commodity Statistics

Details of commodity sales and service takings were compiled from the Census of Retail Establishments and Selected Service Establishments conducted in respect of the year ended 30 June 1980. The definitions and concepts applied to the Retail Census are generally in accordance with those used in the Australian National Accounts.

Retail Trade, as specified in ASIC, generally includes the resale of new or used goods to final consumers for personal or household consumption. Also to conform with the concepts and definitions used in the Australian National Accounts the sale of certain commodity items are treated as wholesale trade, as they are mainly used for commercial purposes. These commodity items are building materials; builders' hardware and supplies such as tools of trade, paint, etc.; commercial refrigerators; business machines; tractors; farm machinery and implements; earthmoving equipment and grain, feed, fertiliser and agricultural supplies. Consequently, where sales of these items constitute the predominant activity of an establishment, the establishment has been classified as a wholesale establishment and not included in the retail census.

The following table shows the number of retail establishments and the value of retail sales by commodity item for 1979-80, excluding bread and milk vendors and single establishment

enterprises with turnover less than \$50,000. Similar data was collected in previous censuses; however, changes in classification (ASIC) and scope as described earlier in this Part make direct comparisons impractical.

RETAIL ESTABLISHMENTS (a) — NUMBER OF ESTABLISHMENTS AND THE
VALUE OF RETAIL SALES BY COMMODITY ITEM: 1979-80

Commodity item	Establish- ments at 30 June (b)	Retail sales		
		Value	Commodity items to total retail sales	Value per head of population (c)
	No.	\$'000	%	\$
Groceries and confectionery	3,164	576,969	16.8	456.1
Fresh meat	957	167,008	4.9	132.0
Fresh fruit and vegetables	1,193	76,018	2.2	60.1
Bread, cakes and pastries	1,617	43,693	1.3	34.5
Ready-to-eat take-away food, including fresh seafoods	1,430	83,330	2.4	65.9
Ice cream, soft drinks, milk drinks — for immediate consumption	2,285	30,750	0.9	24.3
Beer, wine and spirits	339	110,246	3.2	87.2
Cigarettes and other tobacco products	3,105	75,267	2.2	59.5
Furniture, mattresses, awnings, blinds, etc.	413	82,734	2.4	65.4
Floor coverings, carpets, linoleum, floor tiles, etc.	250	50,986	1.5	40.3
Fabrics, piece goods, drapery, manchester, blankets, soft furnishings, etc.	595	71,666	2.1	56.6
Clothing and accessories — men's and boys'	800	101,430	3.0	80.2
Clothing and accessories — women's, girls' and infants'	1,153	176,599	5.2	139.6
Footwear	731	61,150	1.8	48.3
Radios, radiograms, record players, tape recorders, television sets and accessories	447	63,447	1.9	50.2
Musical instruments, records, sheet music, etc.	380	26,547	0.8	21.0
Domestic refrigerators, freezers, washing machines, stoves, clothes dryers, dishwashers, air conditioners and evaporative coolers	301	63,344	1.8	50.1
Other household appliances and accessories	445	38,088	1.1	30.1
Kitchenware, china, glassware and garden equipment	1,030	57,320	1.7	45.3
Petrol, oils and motor lubricants, etc.	1,276	256,805	7.5	203.0
New motor vehicles including trucks and commercial vehicles	258	373,220	10.9	295.0
New parts and accessories for motor vehicles	1,073	88,997	2.6	70.4
Used motor vehicles including trucks and commercial vehicles	451	253,267	7.4	200.2
Used parts and accessories for motor vehicles	167	9,921	0.3	7.8
New and used motor cycles, motor scooters, parts and accessories	138	23,379	0.7	18.5
New and used tyres, tubes and batteries for motor vehicles and motor cycles	991	59,803	1.7	47.3
New and used boats, outboard motors, car, box and boat trailers	102	20,156	0.6	15.9
New and used caravans	41	17,919	0.5	14.2
Cosmetics, perfumes, toilet preparations, etc.	1,036	50,119	1.5	39.6
Prescription and patent medicines and therapeutic appliances	631	54,149	1.6	42.8
Photographic equipment and supplies	564	16,858	0.5	13.3
Watches, clocks, jewellery, silverware	745	43,644	1.3	34.5
Sporting goods and requisites, camping equipment, bicycles, toys, etc.	889	56,636	1.7	44.8
Books, stationery, newspapers, periodicals, devotional and religious goods, artists' requisites	1,528	90,872	2.7	71.8
Antiques, disposal goods, unredeemed pledges and other secondhand goods	166	11,474	0.3	9.1
Cut flowers, garden seeds, shrubs, trees and other nursery stock	286	17,952	0.5	14.2
Goods not included above	593	23,530	0.7	18.6
TOTAL RETAIL SALES		3,425,294	100.0	2,707.7

(a) Excludes all bread and milk vendors and single establishment retail enterprises with turnover of less than \$50,000. (b) Many establishments showed takings in more than one commodity item. Accordingly the sum of the number of establishments showing sales for individual items will exceed the total number of retail establishments. (c) Population at 30 June 1980.

SURVEY OF RETAIL ESTABLISHMENTS

During the periods between retail censuses, quarterly estimates of the value of retail sales by commodity groupings are derived from a sample of retailers throughout the six States of Australia. The sample is drawn from the population of retail establishments enumerated in the censuses which is maintained by the addition of new businesses and the deletion of businesses which cease trading.

Statistics for the current series of estimates are available for quarters from September quarter 1975 onwards and are based on the 1973-74 Census of Retail and Selected Service Establishments.

The table below shows estimates of retail sales by commodity groups for the years 1975-76 to 1980-81.

RETAIL SALES — COMMODITY GROUPS
(\$ million)

Commodity group	Year					
	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Groceries	314.3	374.8	459.9	522.0	588.3	678.8
Butchers' meat	73.4	93.2	110.1	128.6	155.5	177.4
Other food (a)	161.8	194.2	224.9	252.4	282.3	323.6
Beer, wine and spirits	229.5	268.3	297.4	347.2	363.9	400.5
Clothing, drapery, etc.	240.1	273.4	302.8	321.3	346.0	386.5
Footwear	37.0	42.9	48.7	55.3	61.9	70.1
Hardware, china and glassware (b)	66.9	75.9	85.4	96.1	107.4	125.4
Electrical goods and musical instruments	160.5	184.6	176.8	180.2	194.2	227.2
Furniture, floor coverings, mattresses	96.3	113.8	116.3	121.4	133.8	155.4
Chemists' goods	80.9	83.9	93.4	99.7	107.4	124.1
Newspapers, books, stationery	48.3	58.6	66.8	74.2	87.4	103.2
Other goods (c)	137.0	153.1	164.1	191.3	202.9	217.6
Total	1,646.0	1,916.7	2,146.6	2,389.7	2,631.0	2,989.8

(a) Includes fresh fruit and vegetables, confectionery, soft drinks, ice cream, cakes, pastry, cooked provisions, fish and wrapped lunches. (b) Excludes basic building materials, builders' hardware and supplies, such as tools of trade, paint, etc. (c) Includes tobacco, cigarettes, sporting goods etc. but excludes grain and produce and business machines.

Seasonally adjusted retail sales statistics, estimates of the value of retail sales of goods at constant (average 1974-75) prices and further information regarding quarterly estimates of retail sales, together with comparable data for each State and Australia are published by the Australian Statistician in *Retail Sales of Goods* (Catalogue No. 8503.0). Preliminary quarterly estimates of total retail sales for each State and estimates of retail sales for three major commodity groupings for Australia are released in *Retail Sales of Goods, Australia* (Preliminary) (Catalogue No. 8502.0) and monthly estimates of total retail sales in Australia based on a sub-sample of those establishments included in the quarterly sample appear in *Retail Sales of Goods, Australia* (Catalogue No. 8501.0).

A new series of retail sales estimates including a new monthly series by industry groups for individual States, the Australian Capital Territory and Australia has been compiled since April 1982. Details of the monthly series may be found in the May 1982 edition of *Retail Sales of Goods (Excluding Motor Vehicles, Parts, Petrol, etc.)* (Catalogue No. 8501.0).

RETAIL FLOORSPACE STATISTICS

Details of floorspace used for retailing in the Perth Statistical Division were compiled from the Census of Retail Establishments and Selected Service Establishments conducted in respect of the year ended 30 June 1980. Scope and coverage of the census are described earlier in this Part. However, it was not practical to obtain a meaningful measure of floorspace for all industries, and details relating to bread and milk vendors, motor vehicle dealers, petrol and tyre retailers, motion picture theatres, hotels, etc. (mainly drinking places), accommodation, licensed bowling clubs, licensed golf clubs and licensed clubs n.e.c. were excluded.

Total floorspace is the total floor area occupied by establishments (whether rented, leased or owner occupied) including basements and upper floors. It excludes separately located administrative offices and ancillary units, parking areas and residential areas.

Results have been published in the Bureau publication *Census of Retail and Selected Service Establishments, Floorspace, Perth Statistical Division 1979-80* (Catalogue No. 8605.5). Similar data was published for 1973-74 using floorspace figures collected by the Metropolitan Region Planning Authority; changes in scope and coverage however, make direct comparisons impractical.

CENSUS OF TOURIST ACCOMMODATION ESTABLISHMENTS

A Census of Tourist Accommodation Establishments covering aspects such as the amount, type, and geographical location of tourist accommodation available throughout Australia was conducted for the year 1973-74.

Similar statistics for establishments classified to ASIC (1978 edition) classes 9232 — Hotels, etc. (mainly drinking places) and 9233 — Accommodation, were compiled from data collected in the Census of Retail Establishments and Selected Service Establishments conducted in respect of the year 1979-80.

Establishments included in the Census were classified according to their method of operation and the facilities available. Accommodation establishments other than caravan parks must have breakfast available in some form for guests and caravan parks must provide powered sites for caravans (or on-site vans) and toilet, shower and laundry facilities for guests. The classification used was based on the following definitions.

Establishments providing tourist accommodation — comprises hotels, motels, etc. and caravan parks which provide predominantly short term accommodation to the general public.

Establishments providing other accommodation — comprises establishments mainly engaged in providing long term accommodation (i.e. for continuous periods of two months or more) or in providing short term accommodation not available to the general public.

Licensed hotels — includes establishments which are licensed to operate a public bar, and also provide accommodation.

Motels, etc. — includes motels, private hotels, guest houses and boarding houses. These establishments are not licensed to operate a public bar.

Establishments not providing accommodation — includes those establishments in ASIC class 9232 — Hotels, etc. (mainly drinking places) which do not provide accommodation.

With facilities — indicates a bath or shower and toilet in most guest rooms.

Results have been published in the Bureau publication *Census of Retail and Selected Service Establishments, Hotels and Accommodation, Western Australia 1979-80* (Catalogue No. 8624.5).

The following table provides a summary of operations by type of establishment for Western Australia.

HOTELS AND ACCOMMODATION ESTABLISHMENTS
SUMMARY OF OPERATIONS BY TYPE OF ESTABLISHMENT: 1979-80

Type of establishment	Establishments at 30 June	Persons employed at 30 June (a)	Wages and salaries (b)	Turnover	Stocks		Fixed capital expenditure less disposals
					Opening	Closing	
	No.	No.	\$'000	\$'000	\$'000	\$'000	\$'000
Establishments providing tourist accommodation —							
Licensed hotels —							
With facilities	127	4,124	28,138	121,362	3,911	4,131	3,260
Without facilities	183	2,127	12,368	64,164	2,697	2,947	3,070
Motels, etc. —							
With facilities	99	1,572	10,076	33,707	411	471	1,469
Without facilities	43	195	935	2,926	72	76	481
Caravan parks	174	468	1,385	8,196	124	126	3,591
TOTAL ESTABLISHMENTS PROVIDING TOURIST ACCOMMODATION	626	8,486	52,902	230,355	7,215	7,751	11,871
Establishments providing other accommodation —							
With facilities	7	131	908	5,097	109	168	8
Without facilities	102	1,005	5,738	24,255	694	785	765
Camping grounds and caravan parks, n.e.c.	47	130	605	3,292	28	59	756
TOTAL ESTABLISHMENTS PROVIDING OTHER ACCOMMODATION	156	1,266	7,251	32,644	830	1,012	1,528
Establishments not providing accommodation	191	2,082	11,574	61,473	1,821	2,510	5,218
TOTAL ALL ESTABLISHMENTS	973	11,834	71,726	324,473	9,865	11,272	18,619

(a) Includes working proprietors.

(b) Excludes drawings by working proprietors.

TOURIST ACCOMMODATION SURVEY

Following the Census of Tourist Accommodation Establishments, 1973-74 a series of quarterly Tourist Accommodation Surveys, commencing with the September quarter 1975 has provided statistics of the capacity, occupancy rates, etc. of tourist accommodation establishments.

The scope of the survey is the same as the 1973-74 Census and the tourist accommodation component of the 1979-80 Census.

Licensed hotels with facilities — establishments which provide tourist accommodation, are licensed to operate a public bar and provide bath or shower and toilet facilities in most guest rooms.

Motels, private hotels, etc. with facilities — licensed or unlicensed motels, private hotels or guest houses which provide bath or shower and toilet facilities in most guest rooms, but are not licensed to operate a public bar. Motels which are licensed to serve liquor with meals are included in this category.

Establishments without facilities — licensed hotels, private hotels or guest houses which provide tourist accommodation but which do not provide bath or shower and toilet facilities in most guest rooms.

The table below shows survey results for the following types of establishments.

TOURIST ACCOMMODATION SURVEY
HOTELS, MOTELS AND GUEST HOUSES

Year	At 31 December, number of —			Arrivals '000 persons	Occupancy rates (per cent) of —		Takings from accom- modation \$'000
	Establish- ments	Guest rooms	Bed spaces		Rooms	Beds	
LICENSED HOTELS WITH FACILITIES							
1976	123	3.038	5.866	412.8	54	40	10.012
1977	120	2.966	5.853	431.6	57	41	11.816
1978	122	3.097	6.106	441.4	54	39	13.818
1979	123	3.090	6.219	425.0	54	38	15.945
1980	130	3.274	6.669	421.2	53	36	17.460
1981	134	3.578	7.322	458.8	55	37	22.274
MOTELS, PRIVATE HOTELS, ETC. WITH FACILITIES							
1976	96	4.087	10.031	653.1	59	40	14.381
1977	102	4.183	10.419	688.4	58	40	17.259
1978	110	4.645	11.535	676.7	53	36	18.650
1979	115	4.815	12.186	712.0	52	35	22.282
1980	114	4.834	12.178	712.5	50	33	23.231
1981	135	5.346	14.044	767.8	52	35	28.004
ESTABLISHMENTS WITHOUT FACILITIES							
1976	259	4.165	6.699	270.8	39	32	4.656
1977	249	4.256	6.997	265.4	39	30	4.920
1978	238	4.009	6.590	226.6	36	28	4.870
1979	237	4.011	6.690	207.6	34	26	5.047
1980	225	3.693	6.295	195.7	32	24	4.960
1981	221	3.655	6.405	202.6	33	25	5.524
TOTAL							
1976	478	11.290	22.596	1,336.7	50	37	29.048
1977	471	11.405	23.269	1,385.4	51	37	33.994
1978	470	11.751	24.231	1,344.7	48	35	37.338
1979	475	11.916	25.095	1,344.6	47	33	43.274
1980	469	11.801	25.142	1,329.4	45	32	45.651
1981	490	12.579	27.771	1,429.2	47	33	55.802

Caravan parks have been included in the Western Australian survey from September quarter 1975 and in other States' surveys from September quarter 1977.

TOURIST ACCOMMODATION SURVEY CARAVAN PARKS

Particulars	1976	1977	1978	1979	1980	1981
Number of establishments at 31 December	176	197	200	218	229	239
Capacity —						
Powered sites	9,015	10,356	11,206	12,342	12,751	13,615
Unpowered sites	2,190	2,447	2,730	3,705	3,765	3,617
Cabins, flats, etc.	419	433	440	467	484	506
Total capacity at 31 December	11,624	13,236	14,376	16,514	17,000	17,738
Site occupancy rate	per cent	33	37	36	32	28
Guest nights	'000	4,007.8	4,864.4	5,197.7	5,060.2	(a)
Arrivals	'000 persons	663.4	763.5	771.7	756.1	754.0
Takings from accommodation	\$'000	4,367	5,773	7,265	7,879	8,254

(a) Data not collected.

Detailed information (including monthly items of data by type of establishment and area) on the Tourist Accommodation Survey is available from the quarterly publication *Tourist Accommodation* (Catalogue No. 8603.5), issued by this Office.

CONSUMER PROTECTION

The *Consumer Protection Act 1971* provided for the formation of a Consumer Affairs Council and a Consumer Protection Bureau. The legislation was introduced to protect and advance the interests of consumers, as buyers, in their relationships with sellers. The Bureau commenced operations on 11 August 1972 and the inaugural meeting of the Council was held on 21 February 1973. In 1975 the title of the Consumer Protection Bureau was changed to the Bureau of Consumer Affairs by an amendment to the Act which then became the *Consumer Affairs Act 1971-1975*. In November 1978, the *Consumer Affairs Act Amendment Act 1978* established a Consumer Products Safety Committee to advise the Commissioner on the restriction or banning of dangerous consumer products.

The Consumer Affairs Council consists of twelve members representative of a wide cross-section of business and community interests. Broadly, the functions of the Council are to: recommend legislative and administrative action considered necessary in the interests of consumers; advise the Minister on any matters he may refer to the Council; and make recommendations to the Minister on the means by which matters affecting consumers and others interested in the supply of goods or services may receive adequate consideration and to supply information about such matters.

The Bureau of Consumer Affairs is headed by a Commissioner for Consumer Affairs and broadly its functions are to: promote the interests of consumers; collect, collate and disseminate information on matters of interest to consumers; receive and investigate complaints from consumers and if necessary take appropriate remedial action; advise and assist consumers who seek information; assist the Council as required; and disseminate information concerning consumer affairs to producers, manufacturers and suppliers of goods or services.

In conjunction with the Department of Labour and Industry the Bureau also administers directly the following Acts: Motor Vehicle Dealers Act, Door to Door (Sales) Act, Pyramid Sales Schemes Act, Trade Descriptions and False Advertisements Act, Hire-Purchase Act, Unsolicited Goods and Services Act, and Clothes and Fabrics (Labelling) Act.

In addition to the Acts directly administered by the Bureau there are a number of others administered by other authorities which safeguard the interests of consumers. The Bureau works closely with these authorities when handling complaints involving Acts administered by them and in many cases refers complainants directly to them.

Before taking action on a complaint the Bureau requires written advice about the matter from the consumer and evidence that he has made a reasonable attempt to resolve the problem before approaching the Bureau. Subsequent to receiving an apparently justifiable complaint the Bureau contacts the firm or company involved (usually by letter) outlining the complaint and requesting information which will resolve or clarify the situation. If the firm does not co-operate the Bureau has three direct courses of action open to it. The Commissioner may, under threat of prosecution, demand information from any party able to assist the investigation, or he may, under warrant, enter the premises and take or copy any document useful to his investigation, or he may take or defend civil actions on behalf of the consumer if the matter is considered to be in the public interest and he has the approval of the Minister. Apart from direct action as outlined above the Commissioner may arrange for prosecution to be undertaken under an Act not administered by him or he may recommend to the State Government that specific legislation be enacted in broad areas that affect the consumer.

Since 1 July 1977, the Bureau, in association with the other State Bureaus and the Trade Practices Commission, has been participating in the production of a national computerised index of consumer complaints. The system enables each agency to readily assess and compare trends on a State by State and national basis. The system provides for each formal complaint to be coded in accordance with the product or service classification and the practice classification as detailed in the table below. Provision is made for formal complaints to be classified once under the product or service classification and once or twice under the practice classification depending on the nature of the complaint. For example, a complaint alleging that a manufacturer refused to repair under warranty a newly-purchased washing machine would be recorded once under the product or service classification (to Consumer durables) and twice under the practice classification (to Quality of product or service and Guarantees and warranties).

BUREAU OF CONSUMER AFFAIRS COMPLAINTS ANALYSIS: 1980-81
(Source: Bureau of Consumer Affairs)

Product classification	Practice classification										Total (a)
	Com-plaints	Advertis-ing rep-resent-ations	Pack-aging and label-ling	Sales methods	Prices or charges	Quality of product or service	Credit prac-tices	Contracts	Guaran-tees and warran-ties	Offers of redress	
Food, beverages, tobacco	29	14	—	—	1	10	—	4	—	—	29
Clothing, footwear, drapery	222	6	6	35	3	143	1	50	—	13	257
Consumer durables	843	57	1	34	41	465	—	130	133	20	881
Motor vehicles and transport equipment	1,440	29	—	4	50	489	4	207	679	17	1,479
Building and construction	837	28	3	15	64	560	1	145	42	5	863
Miscellaneous products	417	26	1	99	8	138	—	158	44	13	487
Transport and energy services	161	9	—	1	31	37	—	81	—	6	165
Insurance and finance	252	5	—	1	2	3	146	95	1	—	253
Real estate and accommodation	145	9	—	—	4	10	—	123	—	—	146
Miscellaneous services	449	15	—	17	40	219	—	147	6	14	458
Total	4,795	198	11	206	244	2,074	152	1,140	905	88	5,018

(a) Some complaints have been recorded twice under the practice classification.

Chapter IX—continued

Part 3 — Transport

Western Australia's main transport systems are based generally on Perth, the capital, and on Fremantle, the principal port. Subsidiary systems are centred on a number of outports north and south of Fremantle and on some inland towns.

The following table shows distances by road, rail, sea and air between Perth and selected towns and localities in Western Australia.

DISTANCES BETWEEN PERTH AND SELECTED TOWNS AND LOCALITIES
IN WESTERN AUSTRALIA

Town or locality	Road r	Rail	Sea (a)	Air (b)	Town or locality	Road r	Rail	Air (b) r
North of 26°S latitude —	kilo- metres	kilo- metres	nautical miles	route kilo- metres	South of 26°S latitude —	kilo- metres	kilo- metres	route kilo- metres
Coastal —					Inland — <i>continued</i>			
Broome	(c)2,200	..	1,193	1,687	Bruce Rock	243	308	..
Carnarvon	902	..	484	833	Collie	202	198	..
Dampier	1,555	..	..	..	Coolgardie	557	..	..
Denham (Shark Bay)	831	..	479	737	Donnybrook	205	209	..
Derby	(c)2,354	..	1,358	1,813	Forrest	1,492	1,300	1,176
Exmouth	1,260	..	683	(d)1,130	Harvey	140	138	..
Karratha	1,535	..	(e)857	1,296	Hyden	339	554	..
Onslow	1,387	..	733	..	Kalgoorlie	596	655	539
Port Hedland	(c)1,657	..	957	1,330	Kambalda	632	704	546
Roebourne	1,560	..	(f)885	..	Katanning	278	393	..
Wyndham	(c)3,199	..	1,761	..	Koolyanobbing	422	455	..
Inland —					Leonora	833	914	622
Fitzroy Crossing	(c)2,534	..	..	2,033	Madura	1,254	..	..
Goldsworthy	(c)1,700	..	..	1,423	Manjimup	299	313	..
Halls Creek	(c)2,825	..	..	2,257	Meekatharra	765	..	654
Kununurra	(c)3,184	..	..	2,382	Merredin	260	284	..
Marble Bar	1,476	..	..	1,299	Moora	172	174	..
Newman	1,186	..	..	1,030	Mount Barker	359	517	..
Nullagine	1,364	..	..	1,206	Mukinbudin	293	358	..
Paraburdoo	1,536	..	..	1,004	Mullewa	450	544	..
Tom Price	1,553	..	..	1,052	Nannup	277	289	..
Wittenoom	(c)1,448	..	..	1,126	Narrogin	192	292	..
South of 26°S latitude —					Newdegate	399	523	..
Coastal —					Norseman	724	833	552
Albany	409	578	353	400	Northam	97	120	..
Augusta	315	..	..	..	Pinjarra	87	86	..
Bunbury	175	184	104	172	Ravensthorpe	532	..	..
Busselton	224	236	..	..	Southern Cross	369	403	332
Esperance	721	1,033	560	587	Wagin	229	341	..
Eucla	1,436	..	..	..	Wiluna	949	..	761
Fremantle	18	19	..	..	Wyalkatchem	191	237	..
Geraldton	424	493	215	389	York	97	156	..
Inland —								
Bridgetown	262	277	..	..		

(a) From Fremantle. (b) Shortest regular route. (c) Inland route via Great Northern Highway. (d) Distance to Learmonth. (e) Distance to Dampier. (f) Distance to Port Walcott.

The railway system extends from Fremantle, Perth and Midland for hundreds of kilometres into the mining, agricultural, pastoral and forest areas in the southern half of the State. There is also a well-developed road system in this area, and the coastal towns in the north-west and the north are connected by road with the south and with the pastoral and mining areas of the hinterland. The Western Australian Coastal Shipping Commission operates a shipping service which connects Fremantle with the north of the State, the Eastern States and the Northern

Territory. International flights operate through the airport at Perth, which is also the centre of a comprehensive network of airline services to towns in Western Australia and to the capital cities of other States.

In recent years important mineral developments in the north-west have led to the provision of deep-water port facilities and the construction of railways and roads connecting them with the extensive iron ore deposits now being exploited.

SHIPPING

Western Australia's sea-borne trade is conducted through the Port of Fremantle and a number of outports. Of these, Geraldton, Bunbury, Albany and Esperance are situated in the more highly developed south-western and southern parts of the State. The less closely-settled areas of the north-west and the north are served by ports and other landing points at Useless Loop (Shark Bay), Carnarvon, Cape Cuvier, Exmouth, Barrow Island, Dampier, Port Walcott (Cape Lambert), Port Hedland, Broome, Derby, Yampi and Wyndham.

The following table shows the number of entrances into and clearances from each port by vessels coming direct from or going direct to overseas ports during the years 1978-79 to 1980-81. The figures exclude particulars of naval vessels; yachts and other craft used for pleasure; foreign fishing vessels that neither load nor discharge cargo; geophysical and oceanographic research vessels; oil-drilling rigs and vessels servicing them; and vessels of 200 registered net tons and under.

The importance of mineral developments in the north-west of the State is evident from the numbers of entrances and clearances in the ports of Dampier, Port Hedland and Port Walcott. They are surpassed only by the Port of Fremantle, the principal port of Western Australia.

NUMBERS OF OVERSEAS DIRECT VESSELS ENTERED AND CLEARED AT EACH PORT

Port	Entrances			Clearances		
	1978-79	1979-80	1980-81	1978-79	1979-80	1980-81
Port of Fremantle	610	685	589	753	836	692
Other ports —						
Albany	47	55	50	58	76	62
Broome	9	9	12	3	1	4
Bunbury	85	105	99	86	88	94
Carnarvon (a)	61	50	56	62	49	63
Dampier	471	410	383	471	434	394
Derby	13	15	14	9	11	3
Esperance	34	26	33	36	30	25
Exmouth	3	3	4	—	—	—
Geraldton	77	94	91	35	47	55
Port Hedland	449	376	362	408	351	324
Port Walcott (b)	117	136	122	114	133	119
Wyndham	16	19	20	18	25	32
Yampi	48	37	36	51	41	36
Total	1,430	1,335	1,282	1,351	1,286	1,211
All ports	2,040	2,020	1,871	2,104	2,122	1,903

(a) Includes Cape Cuvier and Useless Loop.

(b) Includes Cape Lambert.

**NUMBERS OF OVERSEAS DIRECT VESSELS ENTERED AND CLEARED AT EACH PORT
CLASSIFIED BY TYPE OF VESSEL: 1980-81**

	Type of vessel						
Port	Bulkship	Tanker	Container	Roll-on, roll-off	Conventional cargo	Other	Total
ENTRANCES							
Port of Fremantle	197	73	91	16	61	151	589
Other ports —							
Albany	31	2	1	—	12	4	50
Broome	—	1	—	—	4	7	12
Bunbury	94	—	—	—	4	1	99
Carnarvon (a)	54	2	—	—	—	—	56
Dampier	380	1	—	—	1	1	383
Derby	—	14	—	—	—	—	14
Esperance	25	—	—	—	2	6	33
Exmouth	—	—	—	—	—	4	4
Geraldton	79	—	1	—	2	9	91
Port Hedland	322	11	4	—	7	18	362
Port Walcott (b)	120	1	—	—	1	—	122
Wyndham	—	3	—	—	4	13	20
Yampi	34	1	—	—	—	1	36
Total	1,139	36	6	—	37	64	1,282
All ports	1,336	109	97	16	98	215	1,871
CLEARANCES							
Port of Fremantle	233	77	101	37	104	140	692
Other ports —							
Albany	41	—	—	—	14	7	62
Broome	—	—	—	—	1	3	4
Bunbury	84	1	—	—	9	—	94
Carnarvon (a)	58	4	—	—	1	—	63
Dampier	383	10	—	—	1	—	394
Derby	—	3	—	—	—	—	3
Esperance	18	—	—	—	1	6	25
Exmouth	—	—	—	—	—	—	—
Geraldton	39	—	—	—	5	11	55
Port Hedland	320	2	1	—	—	1	324
Port Walcott (b)	117	1	—	—	1	—	119
Wyndham	—	12	7	—	1	12	32
Yampi	36	—	—	—	—	—	36
Total	1,096	33	8	—	34	40	1,211
All ports	1,329	110	109	37	138	180	1,903

(a) Includes Cape Cuvier and Useless Loop.

(b) Includes Cape Lambert.

Cargo is recorded on returns either in terms of tonnes or of cubic metres depending on the basis on which freight is charged. In the following table the statistics for cargo recorded in tonnes are shown separately from cargo recorded in cubic metres. A figure for gross weight, that is the total weight of cargo excluding the weight of containers, irrespective of the basis on which freight is charged, is also shown.

Apart from general cargo, overseas consignments discharged were principally petroleum and petroleum products, rock phosphate, caustic soda, limestone, sands and sulphur. Outward cargoes from Fremantle consisted largely of alumina, cereal grains, iron and steel, refined petroleum and sheep. Cargo loaded at Esperance comprised mainly cereal grains, salt and sheep; and at Albany cereal grains, sheep and meat. At Bunbury the principal cargoes loaded were alumina, mineral sands, woodchips and cereal grains. Cereal grains and mineral sands were the main items loaded at Geraldton. Principal cargoes loaded in the northern part of the State were iron ore from Dampier, Port Hedland, Port Walcott and Yampi, and salt from Carnarvon, Dampier and Port Hedland.

OVERSEAS CARGO LOADED AND DISCHARGED AT EACH PORT: 1980-81

Port	Loaded			Discharged		
	Tonnes	Cubic metres	Gross weight (tonnes) (a)	Tonnes	Cubic metres	Gross weight (tonnes) (a)
Port of Fremantle	4,137.771	91.736	4,183.294	4,407.408	550.230	4,615.510
Other ports —						
Albany	622.586	191	622.683	143.663	429	144.092
Broome	7.449	—	7.449	6.149	11.405	10.014
Bunbury	2,649.983	—	2,649.983	156.748	—	156.748
Carnarvon (b)	1,060.711	—	1,060.711	27.401	—	27.401
Dampier	34,396.480	—	34,396.480	234.295	—	234.295
Derby	—	—	—	23.370	—	23.370
Esperance	414.882	—	414.882	78.360	—	78.360
Exmouth	115	703	293	—	2,661	680
Geraldton	1,424.802	313	1,425.111	105.724	309	105.873
Port Hedland	29,473.491	—	29,473.491	135.259	71.767	173.684
Port Walcott (c)	13,902.175	—	13,902.175	36.031	—	36.031
Wyndham	26.279	—	26.279	21.464	5.365	25.449
Yampi	2,200.442	—	2,200.442	—	555	121
Total	86,179.395	1,207	86,179.979	968.464	92.491	1,016.118
All ports	90,317.166	92.943	90,363.273	5,375.872	642.721	5,631.628

(a) See text preceding table. (b) Includes Cape Cuvier and Useless Loop. (c) Includes Cape Lambert.

The Western Australian Coastal Shipping Commission was established in 1965 to carry on the services formerly maintained by the State Shipping Service. The Commission's ships operate along the north-west and northern coasts, calling regularly at ports between Fremantle and Darwin (Northern Territory). Besides general cargo, the freight discharged at north-west and northern ports consists mainly of refined petroleum products, bulk cement and other building and construction materials, refrigerated cargo, vehicles and drilling equipment. Cargoes carried south to Fremantle are mainly primary products (such as meat, grains and prawns) and vehicles.

The Commission also maintains a regular link between Fremantle and Bunbury and Melbourne and Tasmanian ports, bringing a range of general cargo including newsprint, other paper products and steel into the State and carrying Western Australian goods (mainly ilmenite, wheat, chemicals and furniture) eastward, principally to Tasmanian ports.

Administration of Ports

The State Government, through the Marine and Harbours Department, controls the ports at Broome, Carnarvon, Derby, Port Walcott (Cape Lambert) and Wyndham. The ports at Albany, Bunbury, Esperance, Fremantle, Geraldton and Port Hedland are controlled by separately-constituted authorities established by Act of Parliament. Private operators control the ports (or landing points) at Barrow Island, Cape Cuvier, Dampier, Exmouth, Useless Loop and Yampi.

Description of Principal Ports

A brief description of the principal ports, at 30 June 1981, is given below. Reference to previous articles on ports appears in the *Appendix*.

Albany. The port of Albany (35°S latitude) is the most southerly port in Western Australia and comprises the waters of Princess Royal Harbour and King George Sound. The effect of tidal movements is negligible and as there is little trouble from fog or storm it is an all-weather port. It embraces an area of 11,800 hectares having an abundance of natural deep water and affording excellent protection to shipping and shore works. Access to Princess Royal Harbour from King George Sound is by means of a channel of 12.2 metres minimum depth and 145 metres wide. Wharfage consists of three berths situated on the northern side of the harbour. These berths are land-backed with a continuous length of 609 metres and a depth alongside of 10.4 metres at No. 1 and No. 2 berths and a depth alongside of 12.2 metres at No. 3 berth.

Bunbury. The port of Bunbury (33°S latitude) is situated in Koombana Bay, 104 nautical miles south of Fremantle, and comprises an inner and outer harbour. It is an all-weather port with a tidal rise and fall of 0.8 metres influenced by weather conditions.

Access to the inner harbour is by means of a dredged channel approximately 2.4 kilometres in length, 12.2 metres in depth and 121 metres wide. The maximum loaded draft permitted in the inner harbour is 11.6 metres. Separate berths, linked by conveyor to shipside storage, provide for the loading of alumina and woodchips at the rate of 2,000 tonnes and 1,000 tonnes per hour, respectively. There is a general purpose berth, 240 metres in length capable of handling roll on/roll off cargo.

The deepest permissible loaded draft of the outer harbour, 8.7 metres, is subject to a small increase at the harbour master's discretion. Wharf berth accommodation consists of two jetty berths with rail access only, each 183 metres in length and two land-backed berths each 184 metres in length. There is a conveyor with a capacity of 900 tonnes per hour used for loading mineral sands and a bulk grain loading facility with a capacity of some 400 tonnes per hour. The cargo transit shed has a cool storage capacity of some 2,300 cubic metres.

Esperance. The port of Esperance (33°S latitude) is situated in Esperance Bay on the south coast of Western Australia. The port has two land-backed berths of concrete and steel construction. Together, they provide a continuous structure 457 metres long, dredged to a depth alongside of 11.0 metres, with a land area backing of approximately forty-seven hectares.

The approach channel to the land-backed berths is 244 metres wide and is dredged to a depth of 11.0 metres. The deepest permissible loading draft is ten metres. Two privately-owned ship loaders are available; one with a loading capacity rate of 860 tonnes per hour, handles salt and bulk grains, the latter product being drawn from a 133,000 tonne capacity storage terminal. The other conveyor, which has a capacity of some 200 tonnes per hour, is used for the loading of minerals. An underground pipeline enables petroleum discharged at No. 2 berth to be conveyed three kilometres to inland storage tanks.

Fremantle. The port of Fremantle (32°S latitude) is the principal port of Western Australia. It is an all-weather port, virtually tideless and little troubled by storm or fog. The port provides modern facilities for the handling of ships, passengers and cargo and is connected to the road and rail systems of Western Australia and Australia generally. It has an area of 44,700 hectares and comprises an Inner Harbour and an Outer Harbour.

The Inner Harbour is constructed within the mouth of the Swan River, about nineteen kilometres from Perth. It is protected by two breakwaters, one 1,474 metres in length and the other 620 metres. The harbour is approached through a short entrance channel dredged to a depth of eleven metres at low water. It encloses eighty-one hectares of water dredged throughout to eleven metres at low water and is the centre of the general cargo trade of the port. There are twenty land-backed berths, with a total quayage of about 4,000 metres. Transit sheds occupy an area of 56,800 square metres and large paved areas are provided for the open storage of cargo. The Inner Harbour is well equipped to handle container, roll-on/roll-off and unit-load cargoes. Further provision is being made to extend facilities by rebuilding some of the older berths.

The Outer Harbour has 18,900 hectares of deep water and is protected from the west by islands and reefs. It embraces three main anchorages of depths up to nineteen metres. Gage Roads, the most northerly of these anchorages, serves as an approach to the Inner Harbour. Owen Anchorage is centrally situated between Success and Parmelia Banks. The largest and most protected of the anchorages, Cockburn Sound, lies to the south and serves the Kwinana industrial area.

There are six jetties in Cockburn Sound. Five of these are owned and operated by private companies concerned with specialised cargoes. They comprise a jetty for the export of grain, an

oil refinery jetty, two jetties to serve a blast furnace and a steel-rolling mill, and a jetty for the export of refined alumina and the import of caustic soda. The sixth jetty, a common-user facility, built by the Port Authority is used mainly for imports of rock phosphate and sulphur.

All Inner Harbour berths are equipped to supply bunker fuel direct to ships from privately-owned storage tanks close to the port and an oil lighter is available to service ships berthed in the Inner Harbour or anchored in the Outer Harbour. Ships can also take on bunker fuel oil at the oil refinery jetty and bulk cargo jetty in the Outer Harbour.

Geraldton. The port of Geraldton (28°S latitude) is situated in Champion Bay on the west coast, 215 nautical miles in a north-westerly direction from Fremantle. The outer harbour, which is ten metres deep, provides a good holding anchorage and the inner harbour, enclosed by a breakwater, affords ample protection for shipping and shore works. The depth of the inner harbour is 9.1 metres, but the rock base of the entrance channel restricts the loaded draught of vessels to 8.7 metres. With the use of tides vessels may load to 9.1 metres at mean sea level (0.8 m tide), or to 9.3 metres at mean higher high water (1.1 m tide). The port has one berth of 99 metres with depth alongside of 8.8 metres and four berths, lengths 203 metres, 203 metres, 181 metres and 213 metres respectively, with depth alongside of 9.4 metres. The cargo transit shed has a floor area of 2,230 square metres and extensive paved areas are available for open storage of cargo. Bulk grain-loading facilities with a capacity of 800 tonnes per hour serve a terminal of 150,000 tonnes capacity. A conveyor system used for loading minerals has a rated capacity of 1,200 tonnes per hour.

Port Hedland. Port Hedland (20°S latitude) is situated on the north-west coast of Western Australia, 957 nautical miles from Fremantle. Access to the harbour is by means of a dredged channel approximately thirteen kilometres in length, 11.8 metres minimum depth and 183 metres wide. The channel, subject to tidal movements, is navigable by vessels drawing up to 16.8 metres. Wharf facilities service five berths. Three privately-owned berths with a total length of 1,039 metres and a depth alongside ranging from 14.8 metres to 17.3 metres are served by three shiploaders, two of them each having a capacity of 6,100 tonnes of iron ore per hour and the third a capacity of 4,570 tonnes per hour. Of the two remaining berths, one is 183 metres in length with a depth alongside of 11.2 metres. It is served by a privately-operated salt-loading facility with a capacity of 1,500 tonnes per hour. The fifth berth is a land-backed general cargo berth 213 metres long with a depth alongside of 11.2 metres.

RAILWAYS

Railways open for general and passenger traffic in the southern part of the State are operated by the Western Australian Government Railways Commission. The system is linked with railways of other States by the Australian National Railways between Kalgoorlie in Western Australia and Port Pirie in South Australia. There are, in addition, private railways for the haulage of iron ore in the northern part of the State and timber in the south-west.

Origin and Development

The first railway in the Colony, built in 1871 from Busselton into the nearby forest, was a private line constructed for the transport of timber. By the end of 1900, the Colony had a railway system for general and passenger traffic which comprised 2,181 kilometres of government line and 446 kilometres of privately-owned line. The State Government system reached a maximum of 7,051 kilometres in 1940 but this figure was reduced, particularly during the 1960s, by the closure of certain non-paying lines.

At 30 June 1981 there were 6,504 kilometres of railway open for general and passenger traffic in Western Australia. Of this total, 5,773 kilometres were owned by the State Government and operated by the Western Australian Government Railways Commission, and 731 kilometres were owned by the Commonwealth Government and operated by the Australian National Railways. At the same date private railways used for the transport of iron ore were

those between Newman and Port Hedland (426 kilometres), Shay Gap and Port Hedland (179 kilometres), Paraburdoo and Dampier (382 kilometres), and Pannawonica and Cape Lambert (173 kilometres).

WESTERN AUSTRALIAN GOVERNMENT RAILWAYS (a)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
FINANCE						
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Capital investment at 30 June (b)	191.434	204.573	209.615	204.298	198.828	191.351
Operating revenues —						
Passenger fares	4.313	4.439	4.541	4.987	5.114	6.325
Parcels and mails	2.780	2.834	2.530	2.377	2.357	2.876
Paying goods and livestock	108.430	113.078	122.418	128.172	143.299	148.422
Miscellaneous	16.788	17.960	21.098	20.431	24.964	24.749
Total operating revenues	132.312	138.311	150.588	155.966	175.735	182.373
Operating expenses	110.893	123.382	140.426	152.627	172.979	186.156
Excess of operating revenues over expenses	21.419	14.928	10.162	3.340	2.755	—3.783
Depreciation	10.314	11.085	10.815	10.481	11.240	10.707
Interest charges	14.231	14.936	15.403	16.940	19.534	22.778
Total deficit (c)	3.041	11.129	16.075	24.140	28.033	37.239
RAILWAY OPERATIONS						
Route kilometres at 30 June —						
1.067 mm gauge (d)	4.798	4.787	4.387	4.393	4.396	4.393
1.435 mm gauge	1.233	1.237	1.229	1.229	1.229	1.229
Dual gauge	132	141	148	148	148	151
Employees at 30 June	9,999	10,119	10,065	9,962	9,727	9,304
	'000	'000	'000	'000	'000	'000
Number of —						
Train kilometres run (e)	13,782	13,696	13,441	12,822	12,486	11,604
Passenger-journeys —						
Suburban (f)	9,141	8,016	8,877	8,854	7,132	6,505
Country	416	414	390	402	r 416	428
Total	9,557	8,430	9,268	9,256	r 7,548	6,933
Tonnes of freight —						
Paying goods and livestock	17,812	19,003	18,625	19,288	21,388	20,271
Departmental (g)	439	369	501	433	549	578
Total	18,251	19,373	19,126	19,721	21,937	20,849
Tonne kilometres —						
Paying goods and livestock	4,548,354	4,532,552	4,273,064	4,178,835	4,730,671	4,488,572
Departmental	64,899	48,891	49,724	43,009	69,438	83,903
Total	4,613,253	4,581,443	4,322,788	4,221,844	4,800,109	4,572,475

(a) Includes details of road services. (b) Including Stores Funds. (c) Actual deficits after adjustment resulting from fluctuations in rates of exchange. (d) Excludes route kilometres of 1.067 mm gauge line which parallels the 1.435 mm gauge line. (e) Revenue and non-revenue train kilometres. (f) Responsibility for the financial and policy direction of the suburban railways passed to the Metropolitan (Perth) Passenger Transport Trust from 1 July 1974. (g) Departmental freight comprises mainly oil, ballast, timber and rails.

The Western Australian Government Railways Commission

The *Government Railways Act 1904-1982* constituted a Commission, in the person of the Commissioner of Railways, who is responsible, subject to the Minister, for the administration of the Act.

The *Government Railways Act Amendment Act 1978* provides the Railways Commission with statutory authority to borrow funds in its own right, subject to specific approval of the Treasurer or the Governor. In addition the Act authorises the Commission to engage in such other financial transactions as are appropriate for trading corporations generally in the normal course of business. The payment of interest and the repayment of loans are guaranteed by the Treasurer on behalf of the State.

Previously funds were provided from the General Loan Fund or from the Consolidated Revenue Fund, the financial procedure being basically the same as for other Departments. The loan liability of the Western Australian Government Railways Commission to the Treasury was \$191,351,286 at 30 June 1981, the net decrease during 1980-81 being \$7,477,107.

In addition to its railways services, the Commission operates an extensive system of road services for the carriage of passengers, mail and freight.

Suburban railway passenger services are operated by the Commission on behalf of and at the direction of the Metropolitan (Perth) Passenger Transport Trust under the provisions of the *Metropolitan (Perth) Passenger Transport Trust Act Amendment Act 1973* which came into operation by proclamation on 22 March 1974. The Commissioner of Railways, as provided by the Act, is an *ex-officio* member of the Trust.

Administrative and operational control of suburban railway passenger services remains with the Commissioner of Railways but, as from 1 July 1974, the Trust accepted responsibility for finance and policy direction in terms of the 1973 legislation.

WESTERN AUSTRALIAN GOVERNMENT RAILWAYS PAYING GOODS AND LIVESTOCK CARRIED (a)

Freight classification	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes
Wheat	3,499,682	3,051,656	2,996,451	2,671,740	3,167,365	2,117,800
Other grain	374,033	403,254	385,459	437,133	366,874	412,066
Grain products	34,626	28,568	21,568	18,232	19,156	12,633
Fertilisers	471,525	525,321	453,392	479,035	517,073	512,916
Fruit and vegetables	78,145	62,452	53,335	33,055	32,301	25,504
Wool	147,602	144,935	116,124	127,668	126,030	124,772
Timber	277,976	271,174	220,640	210,355	228,110	(b) 950,997
Coal, etc.	1,140,419	1,178,776	1,285,291	1,398,577	1,775,260	1,622,711
Ores and minerals	9,319,702	10,246,562	9,904,469	10,680,043	11,722,418	11,696,348
Oil in tank wagons	426,022	552,389	404,175	406,626	425,039	582,459
Other classifications (c)	2,042,531	2,538,183	2,783,920	2,825,986	3,008,776	2,212,709
Total	17,812,263	19,003,270	18,624,824	19,288,450	21,388,402	20,270,915
Number of livestock carried —						
Sheep	1,037,192	1,219,735	407,447	249,471	339,675	248,481
Cattle	31,967	51,178	24,795	14,637	10,788	7,200
Pigs	16,038	12,280	11,231	7,298	8,074	6,460
Horses	168	230	196	282	1,318	3,210

(a) Includes details of road services. (b) Includes woodchips. (c) Includes weight of livestock carried.

Goods and Livestock Carried. The previous table shows the quantity of paying goods and livestock carried during each year in the period from 1975-76 to 1980-81. The classification used in the table is that adopted by the Railways Commission in dissecting its freight transport statistics.

Railways Rolling Stock. The following table shows the number of the various categories of rolling stock of the Western Australian Government Railways in service at 30 June for the years 1976 to 1981.

WESTERN AUSTRALIAN GOVERNMENT RAILWAYS ROLLING STOCK IN SERVICE AT 30 JUNE

Category	1,067 mm gauge						1,435 mm gauge					
	1976	1977	1978	1979	1980	1981	1976	1977	1978	1979	1980	1981
Locomotives —												
Steam	2	2	2	2	2	2	—	—	—	—	—	—
Diesel	163	159	159	169	164	161	43	43	43	43	44	44
Total	165	161	161	171	166	163	43	43	43	43	44	44
Coaching stock	145	140	140	140	131	128	9	9	9	9	9	9
Goods stock (a)	9,943	9,720	9,419	9,078	8,778	8,663	1,263	1,262	1,274	1,278	1,278	1,278
Service stock (b)	431	410	400	385	390	385	24	24	38	85	83	83

(a) Includes brake vans, goods wagons, livestock wagons, mineral wagons, etc. (b) Includes ballast wagons, workmen's vans, ash disposal wagons, water tanks, etc.

Iron Ore Railways

The exploitation of extensive inland deposits of iron ore in Western Australia has necessitated the construction of a number of railways for the transport of ore from the mines to the coast. Conditions applying to the construction and operation of these railways are incorporated in agreements made between the State Government and mining companies and ratified by Act of Parliament.

The following summary relates to railways in use for the transport of iron ore at 30 June 1981. The quantity of ore carried on these railways was 81.5 million tonnes in 1975-76, 83.8 million tonnes in 1976-77, 83.3 million tonnes in 1977-78, 77.7 million tonnes in 1978-79, 89.7 million tonnes in 1979-80 and 79.9 million tonnes in 1980-81. At 30 June 1981 there were 118 locomotives and 5,477 ore wagons in service.

RAILWAYS USED FOR TRANSPORT OF IRON ORE

Railway	Enabling Act	Length (route kilometres)	Gauge	Date operative (a)
Shay Gap-Port Hedland (b)	No. 97 of 1964 (c)	179	1,435 mm	1966 — 23 May
Paraburdoo-Dampier (b)	No. 24 of 1963 (d)	382	1,435 mm	1966 — 1 July
Koolyanobbing-Kwinana (e)	No. 27 of 1961 (f)	490	1,435 mm	1967 — 10 April
Newman-Port Hedland (b)	No. 75 of 1964 (g)	426	1,435 mm	1969 — 18 January
Pannawonica-Cape Lambert (b)	No. 91 of 1964 (h)	173	1,435 mm	1972 — 6 July

(a) Date on which first load of iron ore was dispatched from mine. (b) Privately owned and operated. (c) *Iron ore (Mount Goldsworthy) Agreement Act 1964*. (d) *Iron Ore (Hamersley Range) Agreement Act 1963*. (e) Part of the Western Australian Government Railways' system: open for general and passenger traffic. (f) *Railways (Standard Gauge) Construction Act 1961*. (g) *Iron Ore (Mount Newman) Agreement Act 1964*. (h) *Iron Ore (Cleveland-Cliffs) Agreement Act 1964*.

Australian National Railways

The former Commonwealth Railways comprised four separate systems. These were the Trans-Australian Railway, operating partly in Western Australia and partly in South Australia; the Central Australia Railway, partly in South Australia and partly in the Northern Territory; the North Australia Railway, wholly in the Northern Territory; and the Australian Capital Territory Railway. Commonwealth and State legislation was enacted in 1975 to transfer the Tasmanian Government Railways and the non-metropolitan South Australian Railways to the Commonwealth Government. The Australian National Railways Commission came into existence on 1 July 1975 to control the two transferred systems and the former Commonwealth Railways. Services operating on the North Australia Railway were withdrawn from 30 June 1976. On 1 March 1978 the Australian National Railways Commission assumed full control of the non-urban South Australian State railways and the Tasmanian Government railways. Details of the operations of the non-urban South Australian railways and the Tasmanian railways are included in particulars shown for the National railway system. The State Transport Authority operates urban rail services in South Australia and particulars of these are shown as the South Australian railway system.

GOVERNMENT RAILWAYS IN AUSTRALIA — SUMMARY OF OPERATIONS: 1979-80

Railway system of —	Route kilometres at 30 June	Revenue train kilometres run	Passenger- journeys	Goods and livestock carried	Gross earnings	Average number of employees (a)
State Governments —		'000	'000	'000 tonnes	\$'000	
New South Wales	9,773	59,356	208,821	39,685	495,833	42,599
Victoria	6,184	30,795	88,962	13,454	230,549	22,749
Queensland	9,904	32,589	29,482	38,440	352,700	24,948
South Australia	142	3,977	(b) 73,210	—	(b) 26,943	(b)(c) 3,802
Western Australia	5,773	11,759	(d) 233	21,388	174,258	9,539
Commonwealth Government —						
National	8,789	12,392	585	12,704	157,971	10,673
Australia	40,565	150,868	401,293	125,671	1,438,254	114,310

(a) Excluding construction staff except for Victoria where construction staff are included. (b) Includes details for combined rail, bus and train operations. Separate details for rail are not available. (c) Includes staff on loan from, and paid by, the Australian National Railways Commission. (d) Excludes suburban rail passenger-journeys, which are operated under the direction of the Metropolitan (Perth) Passenger Transport Trust.

Railway Gauges

The next table shows route kilometres of government railways of each gauge in each of the Australian States and Territories at 30 June 1979. Details of route kilometres in each State are compiled according to the State or Territory in which the several lengths of line are situated. Particulars of route kilometres shown for all State systems in the previous section *Australian National Railways* will therefore differ from the details given below.

A summary providing a brief history of the standardisation of gauges on major trunk routes between Perth and Sydney appears in *Western Australian Year Book*, No. 16 — 1977 (pages 460-1) and earlier issues.

GOVERNMENT RAILWAYS IN EACH STATE AND TERRITORY OF AUSTRALIA ROUTE KILOMETRES OPEN AT 30 JUNE 1979

State or Territory	Route kilometres of gauge —			Total route kilometres
	1,600 mm	1,435 mm	1,067 mm	
New South Wales	(a) 328	(b) 9,820	—	10,148
Victoria	5,531	(c) 325	—	5,856
Queensland	—	111	9,678	9,789
South Australia	(d) 2,537	1,871	1,814	6,222
Western Australia	—	2,108	(e) 4,393	6,501
Tasmania	—	—	864	864
Australian Capital Territory	—	8	—	8
Total route kilometres	8,396	14,243	16,749	39,388

(a) Part of the Victorian railway system. (b) Includes 47 kilometres of the A.N.R. System between Cockburn and Broken Hill. (c) Includes 12 kilometres of 1,435 mm/1,600 mm dual gauge line operating in the Melbourne metropolitan area. (d) Includes 142 kilometres of the Adelaide metropolitan railway system operated by the State Transport Authority. (e) Excludes 148 kilometres of 1,435 mm/1,067 mm dual gauge line which is included in the figure shown for the 1,435 mm gauge line.

ROADS AND ROAD TRAFFIC

Work connected with road construction and maintenance and associated projects in Western Australia is undertaken by the State Government, through the Main Roads Department, and by local government authorities.

Under the provisions of the Main Roads Act, the Main Roads Department was established in 1930 to replace the Main Roads Board originally constituted as a central road authority in 1926. The Department operates under the *Main Roads Act 1930-1981* and is administered by a Commissioner of Main Roads who is currently responsible to the Minister for Transport. The Act was amended in 1975 to introduce from 1 July 1976, a new road classification system ranking roads in order of 'highways', 'main roads' and 'secondary roads', thus bringing the terminology in the Act more into line with the functional classifications accepted by the National Association of Australian State Road Authorities. The previous concept of a 'controlled-access' road has been replaced by the power to declare 'control of access' over section or part of, highways and main roads.

Main roads are those which provide communication between a large producing area, either actual or potential, and its market or nearest port or railway station; between two or more such areas; or between large centres of population. They also provide a major route for high volume traffic movements within large urban areas. Highways are defined similarly to main roads but represent a higher functional category. In addition, they provide direct communication between capital cities or between a capital city and a large producing area or a large centre of population. Secondary roads provide feeder routes connecting producing areas with a highway or main road or with their market outlets; connect centres of population; or provide the main means of access to national parks, scenic reserves or sites and seaside resorts. The Main Roads Act provides that, on the recommendation of the Commissioner, any road may be declared by

the Governor to be, or cease to be a highway, main road or secondary road. At 30 June 1982, classified roads comprised 7,739 kilometres of highways, 7,482 kilometres of main roads and 8,740 kilometres of secondary roads.

The construction and maintenance of highways and main roads are the responsibility of the Main Roads Department. The Department also makes substantial financial provision for the construction and maintenance of secondary roads. In addition the Main Roads Act provides that the Commissioner may allocate funds for the construction or improvement of unclassified roads, which are roads of less importance than highways, main roads and secondary roads. The construction and maintenance of strategic roads and roads of access to Commonwealth property is undertaken by the Department for the Commonwealth Government.

Within its own district, each local government authority is responsible for the provision and upkeep of roads other than those provided by the Main Roads Department. In addition, the local authority is required by the Main Roads Act to maintain any secondary road situated in its district.

The following table, derived from data provided by the Main Roads Department, shows the length of public roads open for vehicular traffic at 30 June 1979, classified according to statistical division. Included in the total are 7,721 kilometres of highways, 7,581 kilometres of main roads and 8,740 kilometres of secondary roads. Excluded from the table are 23,558 kilometres of road under the control of the Forests Department, comprising 116 kilometres sealed, 5,618 kilometres gravel and formed and 17,824 unformed.

ROADS OPEN FOR VEHICULAR TRAFFIC AT 30 JUNE 1979
CLASSIFIED ACCORDING TO STATISTICAL DIVISION
(Kilometres)

Statistical division	Formed roads			Total	Unformed roads (b)	Grand total
	Sealed or primed	Gravel surface	Formed only (a)			
Perth Statistical Division	7,881	493	297	8,672	225	8,896
Other statistical divisions —						
South-West	4,496	3,528	1,883	9,907	817	10,724
Lower Great Southern	2,841	3,851	4,037	10,729	1,704	12,433
Upper Great Southern	3,071	4,530	5,811	13,411	961	14,372
Midlands	7,392	9,940	9,638	26,971	2,214	29,184
South-Eastern	2,851	4,239	4,558	11,649	6,067	17,716
Central	4,198	4,822	12,503	21,523	7,728	29,252
Pilbara	1,203	684	3,904	5,791	1,776	7,567
Kimberley	1,295	1,509	3,380	6,184	1,472	7,656
Total	27,348	33,103	45,714	106,165	22,739	128,904
WESTERN AUSTRALIA	35,229	33,596	46,011	114,836	22,964	137,800

(a) Comprises roads, mainly of natural surfaces, formed but not metalled or otherwise prepared. (b) Roads, unprepared except for certain clearing, used for vehicular traffic.

Vehicle Registration, Licences and Traffic Control

Until February 1982 the Road Traffic Authority, established in 1975 by the Road Traffic Act, was responsible for general traffic control (except for certain powers in relation to the parking of vehicles) and the issuing of motor driver's licences. The Authority was also responsible for the registration of motor vehicles with over forty local authorities acting as agents of the Authority in this capacity.

A more detailed account of events preceding the creation of the Road Traffic Authority appears in the *Western Australian Year Book*, No. 14 — 1975.

The *Road Traffic Amendment Act (No. 4) 1981* which came into effect on 2 February 1982 abolished the Road Traffic Authority and established the Traffic Board. Responsibility for the control of traffic was given to the Commissioner of Police while the Traffic Board became

responsible for registration of vehicles and licensing of drivers. The duties associated with the Board's responsibilities are conducted by officers of the Police Department. At 30 June 1982, forty-five local authorities were continuing to act under delegated powers as vehicle licensing bodies.

The Board comprises seven members, namely the Commissioner of Police; the Commissioner of Main Roads; the Co-ordinator General of Transport (or their respective deputies); a member of the Police Force, and three persons appointed by the Governor to represent, respectively, the Local Government Association of Western Australia (Inc.), the Country Shire Councils' Association of W.A., and the Country Urban Councils' Association.

Under the *Road Traffic Act 1974-1981*, persons who have not previously held a driver's licence are issued with a probationary licence, the period of probation being one year. At the end of this period the probationary licence becomes an ordinary licence. Persons who have previously held a licence in a place outside the State are issued with an ordinary licence provided that the previous licence had been held for a period of one year.

The Act provides that the Traffic Board may suspend or cancel a driver's licence under certain conditions, one of which is the number or nature of the convictions under the Act or its Regulations.

In addition to vehicle registration and the licensing of drivers of motor vehicles, the Board is charged with responsibility for the collection and analysis of road traffic statistics and the undertaking of research into the causes and prevention of road accidents. In discharging its functions under the Act, the Board is required, *inter alia*, to maintain a comprehensive knowledge of significant developments in traffic administration and research projects conducted elsewhere and to achieve the most efficient use of resources by eliminating duplication of work performed by any other body or authority, whether established within the State or elsewhere.

The following table shows the number of motor vehicles, classified according to type, on register in the Perth Statistical Division (see map inside back cover) and in the whole of Western Australia from 1975 to 1980. Vehicles owned by the Commonwealth Government are not licensed under the Traffic Act but are included in the figures. The table also gives the estimated number of vehicles per 1,000 of population and the number of persons per vehicle.

MOTOR VEHICLES ON REGISTER (a) AND RATIO TO POPULATION

At 31 December —	Motor cars and station wagons (^{'000})	Light and heavy commercial omnibuses (^{'000})	Motor cycles and scooters (^{'000})	Total (^{'000})	Estimated number of vehicles per 1,000 of population r		Estimated number of persons per vehicle	
					Motor cars and station wagons	All motor vehicles (a)	Motor cars and station wagons	All motor vehicles (a)
PERTH STATISTICAL DIVISION								
1975	317.0	68.8	16.4	402.2	391	496	2.6	2.0
1976	340.9	75.3	17.1	433.3	401	510	2.5	2.5
1977	362.1	83.1	17.3	462.5	418	533	2.4	1.9
1978	379.0	89.1	16.9	484.9	430	550	2.3	1.8
1979	393.2	92.0	17.5	502.6	439	562	2.3	1.8
1980	406.6	95.8	20.2	522.6	447	575	2.2	1.7
WESTERN AUSTRALIA (b)								
1975	424.3	136.3	27.2	587.8	363	503	2.7	2.0
1976	455.6	147.7	28.2	631.5	382	530	2.6	1.9
1977	488.3	159.3	28.2	675.8	401	554	2.5	1.8
1978	508.1	168.6	27.4	704.1	409	567	2.4	1.8
1979	526.5	174.2	27.8	728.5	417	577	2.4	1.7
1980	544.1	181.7	31.5	757.3	423	589	2.4	1.7

(a) Excludes tractors, trailers, caravans, and plant and equipment such as bulldozers, road graders and rollers, and mobile cranes.

(b) Includes Commonwealth Government-owned vehicles (other than those of the defence services) listed with the Commonwealth Motor Vehicle Registry, Canberra. At 31 December 1980 there were in Western Australia 3,491 such vehicles comprising 504 motor cars, 649 station wagons, 1,272 utilities and panel vans, 718 trucks, 41 omnibuses and 307 motor cycles.

Section 231 of the *Local Government Act 1960-1982* authorises local authorities to make by-laws in relation to the parking of vehicles and, in the case of the Perth City Council, certain powers in this regard are granted in terms of the *City of Perth Parking Facilities Act 1956-1981*.

Finance for Roads

The principal source of revenue for road works in Western Australia is in the form of Commonwealth Government financial assistance authorised by a series of Acts, the first of which, the Main Roads Development Act, was passed in 1923. For the three years 1977-78 to 1979-80, assistance totalling \$1.529 million was provided to the States for road construction and maintenance, under the *States Grants (Roads) Act 1977* as amended. The legislation currently in operation for the provision of grants to the States for or in connection with roads is the *Roads Grants Act 1981*. The *Transport Planning and Research (Financial Assistance) Act 1977* provided grants to the States until the end of the 1980-81 financial year when it was repealed following the Review of Commonwealth Functions.

The *Roads Grants Act 1981* provides grants to the States for approved expenditures on national roads, arterial roads, and local roads. Over the five years 1980-81 to 1984-85, the Commonwealth is to provide \$3.650 million to the States and the Northern Territory as grants for road construction and maintenance. Of this amount, an estimated \$662.0 million was to be provided to the States in 1981-82. Western Australia's share of the total in 1981-82 was estimated to amount to \$83.9 million. For national roads, the Act authorised grants totalling \$289.3 million for 1981-82 of which \$31.8 million was allocated to Western Australia. For the other categories of roads, Western Australia's share of the total grant of \$372.6 million for 1981-82 was \$52.1 million comprising \$28.8 million for arterial roads, and \$23.3 million for local roads.

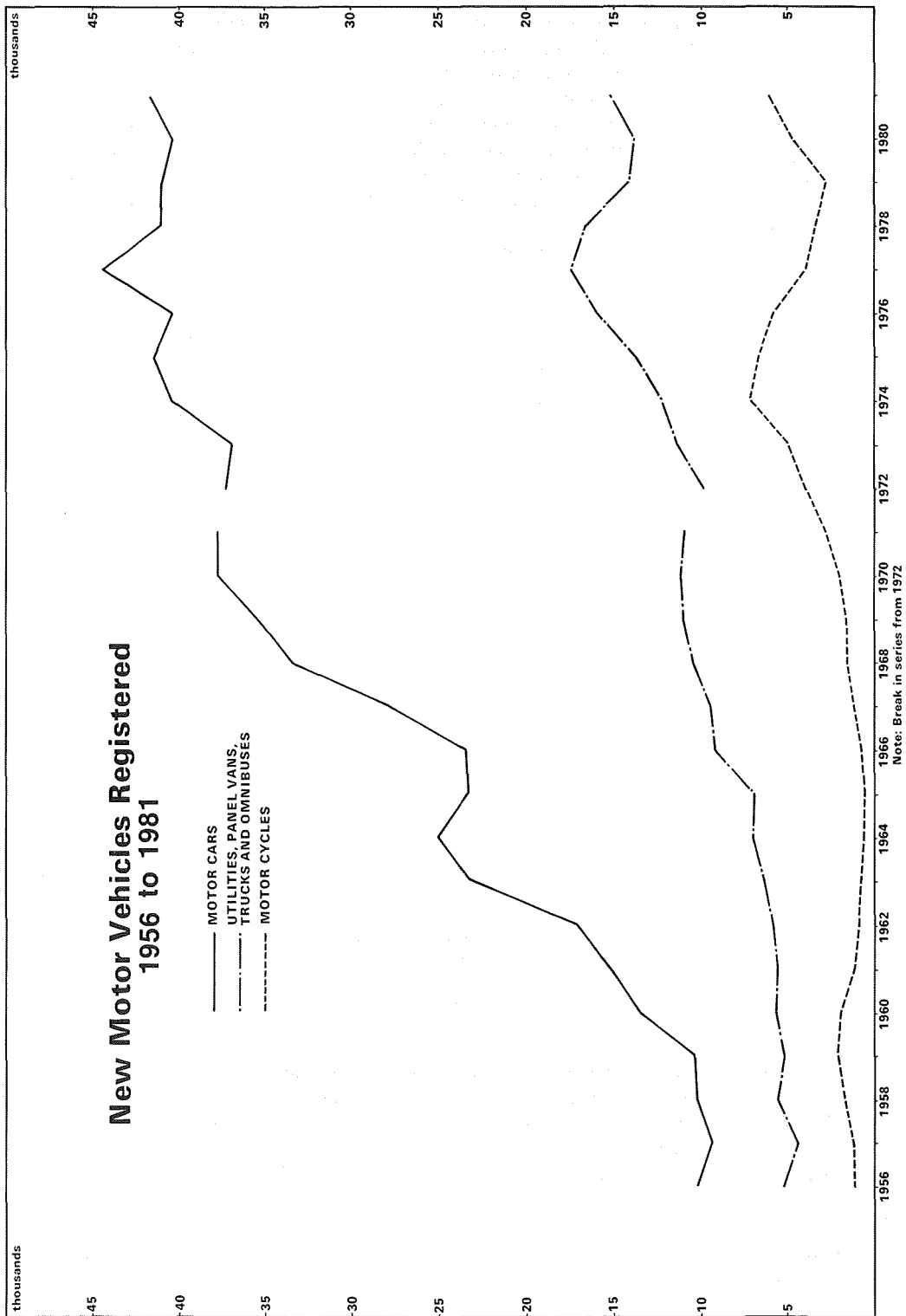
The *Transport Planning and Research (Financial Assistance) Act 1977* authorised the Commonwealth Government to grant financial assistance to the States for approved projects of planning and research in relation to land transport. The Act applied to the year commencing on 1 July 1977 or any succeeding year until 1 July 1980 and provided for the States to bear a proportion of the costs of projects. Of \$6.3 million allocated to the States for 1980-81, Western Australia's share amounted to \$0.58 million.

Western Australian Acts which provide for a system of receipt and disbursement of moneys for road purposes are the *Road Traffic Act 1974-1981*, the *Transport Act 1966-1981*, and the *Main Roads Act 1930-1981*.

The *Road Traffic Act 1974-1981* provides for payment to the Main Roads Trust Account, maintained under the Main Roads Act, of all fees received for the issue, renewal and transfer of motor vehicle licences (other than recording fees) and for the issue of excess load permits.

In conjunction with the repeal of the *Road Maintenance (Contribution) Act 1965-1978*, the *Transport Commission Act 1966-1981* was amended to provide for licence fees to be paid by businesses engaged in the wholesaling of petroleum products. Enabling legislation was authorised in May 1979 by the *Acts Amendment and Repeal (Road Maintenance) Act 1979*, which also provides for such licence fees to be paid to the Main Roads Trust Account.

The *Main Roads Act 1930-1981* provides for payment to the Main Roads Trust Account of moneys received from the Australian Government as financial assistance in relation to roads; amounts payable under the provisions of the Traffic Act or any other Act; moneys appropriated by the Parliament; and payments by local government authorities in respect of permanent works and the maintenance of main roads and developmental roads. Moneys standing to the credit of the Account are used to meet expenditure by the Commissioner of Main Roads on the administration of the Act and the construction of roads and associated works, and to provide funds to local government authorities for roads and road works.



The *Main Roads Act Amendment Act 1980* established a system of grants to local government authorities for each of the three financial years during the period ending 30 June 1983. The Act allocates each local government authority to one of five groups and provides for payment of a base grant to each local government authority for road construction and maintenance, and for payments of additional grants for approved programmes. The conditions relating to matching expenditures and, where applicable, to additional grants vary according to the groups. The total amount available to local government authorities in 1981-82 was \$23.3 million. In addition, a provision of the *Main Roads Act Amendment Act 1975* empowers the Commissioner of Main Roads to borrow money for the purpose of road construction and associated activities, subject to the approval of the Minister.

Grants payable from the Main Roads Trust Account are an important source of funds available to local government authorities for road construction and maintenance. Other moneys may be provided from the ordinary revenue of a local authority or from loans raised for road purposes.

ROAD PASSENGER TRANSPORT SERVICES

Details of the operations of government and municipal omnibus services in Western Australia during the six years ended 30 June 1981 are given in the following table.

OMNIBUS SERVICES (a)

Year	Route kilometres operated (b)	Omnibuses at end of year	Omnibus kilometres run '000	Passenger-journeys '000	Employees at end of year	Operating revenues (c) \$'000	Operating expenses \$'000	Depreciation \$'000	Interest \$'000
METROPOLITAN (PERTH) PASSENGER TRANSPORT TRUST									
1975-76	1.402	818	38.142	59.514	1.950	11.933	21.665	948	793
1976-77	1.433	835	38.451	57.259	2.007	14.096	25.298	1,129	792
1977-78	1.452	853	38.785	56.736	2.047	13.875	27.859	1,323	1,055
1978-79	1.477	864	38.701	53.489	2.031	14.287	29.533	1,540	1,117
1979-80	1.515	896	41.012	55.903	2.097	14.972	37.205	1,682	1,105
1980-81	1.564	899	42.413	56.820	2.113	18.715	42.440	1,740	1,196
WESTERN AUSTRALIAN GOVERNMENT RAILWAYS									
1975-76	6.200	49	2.821	154	139	940	1,467	83	24
1976-77	6.916	48	2.675	163	137	988	1,473	64	19
1977-78	6.916	50	2.711	157	136	1,111	1,649	58	15
1978-79	6.956	47	2.834	173	137	1,370	1,784	121	69
1979-80	7.011	45	2.894	190	136	1,549	2,102	104	61
1980-81	7.011	43	2.937	205	127	1,936	2,290	130	91
THE EASTERN GOLDFIELDS TRANSPORT BOARD									
1975-76	29	17	590	617	20	196	211	21	—
1976-77	28	20	674	608	25	287	298	29	—
1977-78	45	20	675	626	25	378	347	36	—
1978-79	45	22	512	626	21	411	374	52	—
1979-80	45	21	619	552	22	471	434	81	—
1980-81	45	20	632	517	19	563	499	86	—

(a) Excludes tourist services.

(b) Excludes school bus routes.

(c) Passenger fares and subsidies only.

Motor omnibus services (as well as a passenger ferry service) in the metropolitan area are operated by the Metropolitan (Perth) Passenger Transport Trust, constituted under the *Metropolitan (Perth) Passenger Transport Trust Act 1957-1980*. For the purposes of the Act, the metropolitan area is defined by a proclamation of 6 June 1973 as being 'all the land within a circle having a radius of 50 kilometres from the Perth Town Hall' and in addition, an area bounded by the South-Western Highway and the ocean, extending southward to an east-west line 1.6 kilometres south of the town of Pinjarra.

Road transport of passengers outside the metropolitan area is provided by the railways road services which cover long-distance routes between Perth and country centres and by The Eastern Goldfields Transport Board, which serves the Kalgoorlie-Boulder urban area under an agreement

with the Kalgoorlie and Boulder local government authorities. In addition, at 30 June 1981 private operators, employing 615 buses, were licensed to provide tourist, town, area and charter services.

In certain country areas, children are taken to and from school by motor bus at government expense. In 1980-81 the cost to the Government of school transport services was \$14,631,080. The number of omnibuses engaged was 794. Each day they travelled a total of 129,310 kilometres and carried 25,198 children.

MOTOR VEHICLE USAGE

A survey conducted by the Australian Bureau of Statistics throughout Australia in late 1979 collected data on motor vehicle usage relating to the twelve months ended 30 September 1979. This survey was similar to others carried out in 1963, 1971 and 1976.

The survey was based on a sample of approximately 57,000 vehicles, of which some 75 per cent were trucks and other commercial types in order to ensure adequate representation of the various types in this diverse sector.

Because the survey results are based on a sample, representing some 7.4 million vehicles on register at 30 September 1979, they are subject to sampling variability when compared with results which would have been obtained from a complete census of all registered motor vehicles using the same questionnaires and procedures.

Results of the survey showed, in Western Australia, an average annual distance travelled of 16,200 kilometres for all vehicles. Cars and station wagons averaged 15,900 kilometres, while articulated trucks averaged 51,800 kilometres.

Detailed information appears in the publication *Survey of Motor Vehicle Usage, Twelve months ended 30 September 1979*, (Catalogue No. 9208.0), published by the Australian Statistician, Canberra.

ROAD TRAFFIC ACCIDENTS

Statistics of road traffic accidents are prepared from information concerning accidents in public thoroughfares, as reported to officers of the Police Department. Accidents involving casualties are those which result in the death of any person within a period of thirty days after the accident, or in which any person suffers bodily injury to an extent requiring surgical or medical treatment.

The accompanying table shows, for each year during the period 1976 to 1981, the number of accidents involving casualties which occurred in Western Australia. Since 1976, there have been three breaks in the continuity of 'casualty accident' and 'persons injured' statistics.

- (i) *Between 1976 and 1977.* In 1976 and previous years, persons injured were included in the statistics only if the injuries required surgical or medical treatment. However in August 1977, the Road Traffic Authority introduced a new road traffic accident reporting system involving a new report form and changed collection procedures. As a result, cases that would have been excluded up to August 1977 because the persons were injured but did not require surgical or medical treatment were included in the statistics from August 1977.
- (ii) *Between 1977 and 1978.* Statistics for 1978 were derived solely from the new accident report form while 1977 data were derived from both the old and new accident report forms.
- (iii) *Between 1979 and 1980.* In January 1980, the Authority further revised the accident report form. The question relating to casualties requiring medical treatment was expanded to identify persons injured but not requiring medical attention. These cases are excluded from the published series for 1980 and subsequent years. It has not been possible to measure the difference resulting from the expanded question and a break in series is regarded as having occurred between 1979 and 1980.

ROAD TRAFFIC ACCIDENTS INVOLVING CASUALTIES WESTERN AUSTRALIA

Particulars	1976	1977 (a)	1978	1979	1980 (a)	1981
WESTERN AUSTRALIA						
Accidents involving casualties —						
Total	5,287	6,224	7,513	7,025	6,460	6,364
Per 10,000 motor vehicles on register (b)	87	96	109	98	87	82
Per 100,000 of mean population (c)	452	520	615	565	511	493
Number of persons killed —						
Total	308	290	345	279	293	238
Per 10,000 motor vehicles on register (b)	5	4	5	4	4	3
Per 100,000 of mean population (c)	26	24	28	22	23	18
Number of persons injured —						
Total	7,059	8,353	10,069	9,342	8,386	8,255
Per 10,000 motor vehicles on register (b)	117	128	146	131	113	107
Per 100,000 of mean population (c)	603	698	824	752	663	639

(a) See section 'Road Traffic Accidents'. (b) For 1980 and earlier years, mean of vehicles on register. From 1981, vehicles on register at 30 June. (c) Based on latest available population figures.

The compilation and publication of comparable road traffic accident statistics for Australia was suspended from July 1978 because of a lack of uniformity among States in both the definition of data items and in accident reporting and recording procedures. Publication of a limited range of detailed Australian road traffic accident statistics recommenced in January 1980 and are to be found in the publication *Road Traffic Accidents Involving Casualties (Admissions to Hospitals), Australia* (Catalogue No. 9405.0) issued quarterly by the Australian Statistician, Canberra.

In the next table road traffic accident casualties which occurred in Western Australia during the six years ended 31 December 1981 are classified according to type of road user. The figures shown in the category 'Other' refer to road user type not stated and to such persons as bystanders, train drivers, riders of horses and drivers of animal-drawn vehicles.

ROAD TRAFFIC ACCIDENTS CASUALTIES ACCORDING TO TYPE OF ROAD USER

Type of road user	1976	1977	1978	1979	1980	1981
PERSONS KILLED						
Drivers of motor vehicles	107	93	131	106	126	97
Motor cyclists (a)	32	27	25	30	32	31
Pedal cyclists	7	10	7	4	6	4
Passengers —						
Pillion	5	6	6	2	4	—
Other	96	95	103	74	67	61
Pedestrians	59	58	56	55	56	43
Other	2	1	17	8	2	2
Total	308	290	345	279	293	238
PERSONS INJURED						
Drivers of motor vehicles			4,425	4,260	3,968	3,939
Motor cyclists (a)			758	707	765	785
Pedal cyclists			168	241	273	299
Passengers —						
Pillion			151	128	109	112
Other			3,466	3,174	2,633	2,520
Pedestrians			602	593	544	544
Other			499	239	94	56
Total			10,069	9,342	8,386	8,255

Figures for 1976 and 1977 are not comparable with those for later years.
See section 'Road Traffic Accidents'.

(a) Includes riders of motor scooters.

The following table gives a classification of casualties according to the ages of persons killed and persons injured during each year of the period from 1976 to 1981.

ROAD TRAFFIC ACCIDENTS — CASUALTIES CLASSIFIED ACCORDING TO AGE

	Age last birthday (years)										
Year	0-4	5-6	7-16	17-20	21-29	30-39	40-49	50-59	60 and over	Not stated	Total
PERSONS KILLED											
1976	7	5	29	71	56	42	23	27	46	2	308
1977	13	4	30	47	75	27	24	24	44	2	290
1978	14	6	35	75	76	36	22	25	52	4	345
1979	6	5	25	54	74	38	19	15	43	—	279
1980	9	7	30	56	68	43	20	22	38	—	293
1981	5	—	15	40	63	29	26	21	39	—	238
PERSONS INJURED											
1976	Figures for 1976 and 1977 are not comparable with those for later years.										
1977	See section 'Road Traffic Accidents'.										
1978	200	102	927	2,117	2,304	1,091	711	529	607	1,481	10,069
1979	186	106	909	1,982	2,212	1,058	721	535	549	1,084	9,342
1980	175	129	870	1,770	2,098	1,116	638	489	464	637	8,386
1981	167	98	815	1,674	2,062	1,124	673	476	536	630	8,255

Road traffic accidents during the year ended 31 December 1981 are classified in the next tables according to nature of accident and type of traffic unit involved.

ROAD TRAFFIC ACCIDENTS — NATURE OF ACCIDENT

Nature of accident	1981		
	Accidents involving casualties	Casualties	
		Persons killed	Persons injured
Vehicle to vehicle collisions —			
On carriageway —			
Vehicles in traffic	3,353	78	4,424
Vehicles parked	147	3	178
Single vehicle accidents —			
On carriageway —			
Struck object	46	1	52
Struck pedestrian	533	39	537
Struck animal	62	2	66
Passenger accident	26	—	29
Overtaking	167	7	209
Off carriageway —			
Without colliding	529	32	777
Struck object	873	58	1,137
Struck vehicle	18	1	23
Struck animal	1	1	—
Struck bystander	15	2	14
Other accidents	594	14	809
Total	6,364	238	8,255

ROAD TRAFFIC ACCIDENTS — TYPE OF UNIT INVOLVED

Type of unit	1981		
	Units involved (a)	Casualties	
		Persons killed	Persons injured
Motor car	6,889	110	4,793
Station wagon	1,279	18	878
Utility	515	12	318
Panel van	463	8	309
Truck	213	4	81
Semi-trailer	91	5	48
Bus	75	—	20
Tractor	15	—	6
Motor cycle or scooter, moped	898	31	897
Pedal cycle	347	4	326
Railway vehicle	7	—	—
Pedestrian	620	43	544
Trailer, caravan	150	—	5
Animal, animal-drawn vehicle	3	2	1
Other	136	1	20
Not stated	58	—	9
Total	11,759	238	8,255

(a) The number of each type of unit involved in casualty accidents.

For additional information on road traffic accidents in this State, the reader is referred to the publication *Road Traffic Accidents involving Casualties* issued quarterly (Catalogue No. 9401.5) and annually (Catalogue No. 9402.5) by the Western Australian Office of the Australian Bureau of Statistics.

PASSENGER FERRY SERVICE

The Metropolitan (Perth) Passenger Transport Trust operates a passenger ferry service across the Swan River from Perth to South Perth and makes boats available for charter. Particulars of private charter excursions, other than those which relate to operating revenues and expenses, are excluded from the figures in the following table which gives a summary of operations over the period 1975-76 to 1980-81.

PASSENGER FERRY SERVICE

Year	Ferries at end of year	Kilometres run (a)	Passenger-journeys (a)	Employees at end of year	Operating revenues	Operating expenses	Depreciation	Interest
					\$	\$	\$	\$
1975-76	5	36,456	372,778	10	121,728	138,570	5,099	10,840
1976-77	5	38,158	342,077	11	134,929	140,753	5,346	8,910
1977-78	5	40,098	336,407	11	158,866	160,745	4,646	6,630
1978-79	5	39,214	309,378	10	206,551	181,686	5,218	7,400
1979-80	5	39,708	336,718	10	209,612	199,139	5,922	7,500
1980-81	5	39,656	334,542	11	245,392	230,505	5,920	8,900

(a) Excludes private charter operations.

AIR TRANSPORT

The supervision and control of civil air transport throughout Australia is the responsibility of the Commonwealth Department of Aviation. Its regulatory functions include the licensing of air crew, engineering staff, airlines, charter and aerial work operators, flying schools and aerodromes; the issuing of approvals for export of aircraft and permits for import of aircraft; and the establishment and operation of air traffic control procedures. The Federal Minister for Aviation has the responsibility for the approval of international fares, freight rates and timetables. The Department is responsible for the conduct of search and rescue operations; the determination of air rules and enforcement of safety regulations; the setting of requirements for and the issue of certificates of airworthiness for all civil aircraft; the provision and maintenance of government aerodromes, aeronautical communication systems and radio navigational aids;

the specification of required meteorological services; the administration of aviation security and aviation medical policies and standards; and the negotiation and administration of international air transport agreements. It also co-operates with the State Transport Commission which has a statutory licensing function in respect of air transport facilities within the State.

An extensive system of regular air services operates in Western Australia for the transport of passengers, freight and mail. At 1 April 1982 the International Airport, twelve road kilometres from central Perth, was used by:

- (i) ten international operators providing regular jet services to and from Africa, Europe, India, Indonesia, Malaysia, the Middle East, Singapore, Hong Kong, Thailand and New Zealand;
- (ii) two interstate operators providing up to twelve jet services per day between Perth and other Australian capital cities;
- (iii) one intrastate operator providing frequent jet services to eleven other towns in Western Australia and to one town in the Northern Territory; and
- (iv) commuter operators connecting Perth with twenty-five country centres.

Other commuter services connect thirty-five townships and stations with ports on jet routes.

During the past ten years the average annual passenger traffic growth at Perth Airport has exceeded 10 per cent.

In addition to the aircraft capacity provided by airline and commuter operators there is a large fleet of light aircraft available for charter work and all kinds of aerial work including aerial surveys, spotting, aerial agriculture, etc. This fleet, which includes executive twin-jet type aircraft and helicopters, numbered 321 on 1 January 1982 when there were another 475 private (non-commercial) aircraft based in Western Australia.

Perth Airport is equipped with modern electronic and electrical navigation and approach aids to enable operations in periods of low visibility, and thirteen airports in the State have been equipped with visual approach slope indicator lighting systems to permit regular jet operations at those ports. There are ten flight service and three air traffic control establishments at various ports throughout Western Australia.

On 1 March 1982 the Commonwealth Government owned and maintained twenty aerodromes in Western Australia and there were twenty-nine licensed aerodromes owned privately or by local authorities. Strips suitable for use by light aircraft and scattered throughout the State were estimated to exceed 1,000 in number. The Royal Flying Doctor Service, which has occasion to operate to and from many of those strips, has a number of bases in Western Australia and details of its activities are given in Chapter V, Part 3.

Airport Operations. The following table, compiled from information published by the Commonwealth Department of Aviation, provides a summary of civil air transport operations at principal airports in Western Australia during each of the years 1978 to 1980. The figures refer only to regular public transport operations on scheduled services by licensed airlines and exclude charter and commuter services. Commuter service is a term used to describe regular flights by charter firms with small aircraft operating to fixed and published timetables.

CIVIL AIR TRANSPORT — TRAFFIC HANDLED AND AIRCRAFT MOVEMENTS AT PRINCIPAL AIRPORTS

Airport	Passengers (a)			Freight (tonnes) (b)			Aircraft movements (c)		
	1978	1979	1980	1978	1979	1980	1978	1979	1980
Broome	19,967	23,158	30,015	286	311	356	1,734	1,866	2,215
Carnarvon	15,182	16,625	17,108	105	123	138	1,092	1,228	1,357
Derby	27,277	29,097	34,487	873	838	846	2,354	2,210	2,580
Geraldton	34,414	32,382	32,208	110	94	77	1,758	1,680	1,636
Kalgoorlie	29,667	29,274	39,088	188	178	173	865	835	1,692
Karratha	58,996	58,971	62,271	883	784	751	2,858	3,092	3,231
Kununurra	20,753	22,421	25,269	480	470	405	1,340	1,498	1,600
Learmonth	8,059	13,479	14,761	81	99	121	677	1,066	1,160
Newman	29,929	25,894	24,865	356	338	306	1,713	1,732	1,806
Paraburdoo	39,445	26,740	27,068	669	509	458	2,024	1,936	1,945
Perth —									
Internal (d)	815,000	879,113	928,095	13,970	13,330	12,800	13,085	13,013	13,654
International	225,341	261,182	324,977	3,691	4,427	5,596	3,433	3,309	2,977
Port Hedland	66,274	69,098	76,225	2,281	2,757	1,972	4,054	4,051	4,412

(a) Total of embarkations and disembarkations. (b) Total of freight loaded and unloaded. (c) Total of arrivals and departures. (d) Interstate and intrastate.

Casualty Accidents. The following table shows the number of accidents involving civil aircraft which resulted in death or serious injury.

CIVIL AIR TRANSPORT — ACCIDENTS INVOLVING CASUALTIES (a)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
WESTERN AUSTRALIA						
Number of —						
Accidents (a)	3	6	6	3	8	10
Persons killed	6	—	10	1	7	9
Persons seriously injured	1	9	3	4	9	5
AUSTRALIA						
Number of —						
Accidents (a)	32	33	47	43	48	37
Persons killed	54	39	58	42	50	47
Persons seriously injured	24	24	27	37	44	33

(a) Accidents involving civil aircraft which resulted in death or serious injury. Excludes parachutists killed on contact with earth after an uninterrupted fall. Excludes accidents outside Australia involving aircraft on the Australian register.

The statistics relate to the following classes of operation: regular public transport; charter flights; aerial agriculture; training; other aerial work; private; and gliding.

TRANSPORT CO-ORDINATION

State Transport Co-ordination Act

The *State Transport Co-ordination Act 1981*, which came into operation on 2 July 1982, repealed the *State Transport Co-ordination Act 1966-1980*. The Act provided for the appointment of a Co-ordinator General of Transport and the establishment of Transport Strategy Committees. The Transport Advisory Council and Transport Users' Board established under the *State Transport Co-ordination Act 1966* have been abolished.

The duties of the Co-ordinator General are to recommend to the Minister measures for achieving co-ordination of the various forms of transport in the State; to report on transport policy or changes in transport policy and measures for achieving policy objectives; to report on trends and developments in transport within the State and elsewhere and on transport requirements within the State; to provide assistance and advice in the development and application of appropriate planning techniques and the establishment and maintenance of detailed plans for resource use, operations and, where appropriate, marketing; to report on sources and uses of funds for the advancement of transport services; to undertake research relating to transport and such other duties relating to transport as the Minister may require.

A Transport Strategy Committee comprises the Co-ordinator General of Transport (as Chairman) and such other persons as the Minister considers suitable. Any number of Transport Strategy Committees may be established and in operation at any one time. The duty of each Transport Strategy Committee is to advise the Minister on such matters relating to transport policy as were referred to it by the Minister.

Transport Act

The *Transport Act 1966-1981* provides for the appointment of a Commissioner of Transport who, under the general control of the Minister, is responsible for the administration of the Act. In addition, the Commissioner is required to inquire into existing transport services; to recommend the provision of new or additional road transport services; to examine and report on any proposal for the construction of a new railway; to recommend the closure or partial suspension of any transport service, including a railway; and to advise the Minister on the administration of specified Acts relating to transport. These responsibilities were previously those of the Director (now Co-ordinator) General of Transport. Under the direction of the Minister, the Commissioner is required to call tenders for the provision of transport services; to administer and direct the payment of subsidies with respect to the provision of transport as may be authorised under the Act; to consider and determine all applications for licences in respect of the transport of passengers and goods by road, rail, air and sea; to conduct such investigations, enquiries, study or research as he considers necessary or desirable, on matters related to the operational and economic stability of the transport industry in this State; to enquire into and recommend the minimum rates of remuneration payable in respect of the operations of commercial goods vehicles pursuant to sub-contracts; and to consider and determine all applications for licences in respect of persons who carry on the business of selling petroleum products.

Vehicles required to be licensed by the Commissioner under the Act are omnibuses, other than those operated by the Metropolitan (Perth) Passenger Transport Trust; commercial goods vehicles; aircraft, other than those operated solely in connection with the Royal Flying Doctor Service; and ships, other than those operated by the Western Australian Coastal Shipping Commission.

Financial transactions are recorded in a Transport Commission Fund as required by the Act. The principal revenues of the fund are receipts from licence and permit fees and amounts received from the Treasury for distribution in the form of subsidies to transport operators and others in certain areas. The expenditure from the fund includes amounts necessary to meet administration costs, such amounts as are necessary or expedient to be granted in aid of any transport service or scheme for which the Commissioner has a responsibility or to maintain a trust fund to be used for the provision, maintenance and improvement of any aircraft landing ground or facilities, and such amount as is necessary or expedient to establish and maintain a reserve of moneys to facilitate the carrying out by the Commissioner of his powers and functions under this Act.

Taxi-cars (Co-ordination and Control) Act

The *Taxi-cars (Co-ordination and Control) Act 1963-1981* constitutes a Taxi Control Board of seven members to provide for the co-ordination and control of taxi-cars and the registration and conduct of taxi-car drivers in the Metropolitan Traffic Area and such other areas as may be declared. The Act provides that the Board shall consist of the Commissioner of Transport (as Chairman); a representative appointed, from time to time, by the Traffic Board; and five persons, appointed by the Governor, comprising one to represent the interests of local authorities, chosen from a panel of names that is obtained by each local authority submitting the name of one person; three industry members, including at least one taxi-car owner and one full-time driver who is not also an owner, elected by taxi-car owners or full-time drivers of taxi-cars; and one nominated by the Metropolitan (Perth) Passenger Transport Trust.

The principal functions of the Board are the formulation and enforcement of schemes for the co-ordination, operation and control of taxis; the determination of the number and kind of taxis to be licensed; the issue, cancellation and suspension of licences; the determination of fares and other charges; the supervision of the operation of taxis and the regulation and establishment of stands; the registration of, and the control of the conduct and dress of, drivers; and the enforcement of regulations made under the Act.

It is provided that the number of taxis that may be licensed to operate within the metropolitan area shall not at any time exceed one for every 800 of the population of the area.

The Act established a Taxi Control Fund for the receipt of fees payable on the issue, renewal or transfer of licences. The expenses of the administration of the Act are paid from the Fund.

Chapter IX—continued

Part 4 — Communication

POSTS, TELEGRAPHS AND TELEPHONES

The first postmasters in the Colony of Western Australia were appointed at Perth and Fremantle in 1830 and a Postal Department was established by the Colonial Government in 1834. Telegraphic communication, between Perth and Fremantle, was inaugurated in 1869 by means of a private line, which was purchased by the Government in 1871. A telephone exchange system, installed and operated by the Government, was opened at Perth in 1887.

In 1901, following the federation of the Australian Colonies, the post, telegraph and telephone services of the State Governments were transferred to the Commonwealth Government. The Post and Telegraph Act of 1901 placed the services under the control of a Commonwealth Minister to be known as the Postmaster-General. The *Postal Services Act* 1975, *Telecommunications Act* 1975, and *Postal and Telecommunications Commissions (Transitional Provisions) Act* 1975 established two statutory authorities, the Australian Postal Commission (Australia Post) and the Australian Telecommunications Commission (Telecom) to control, respectively, from 1 July 1975, the postal and telecommunications services previously provided by the Postmaster-General's Department. Figures shown in the tables in the next two sections for the years ended 30 June 1976 to 1981, have been extracted from the annual reports of the two Commissions.

Australian Postal Commission

The following table shows the number of persons employed by the Australian Postal Commission in Western Australia, and the number of post offices throughout the State at 30 June 1976 to 1981. Full-time employees are those directly under the control of the Commission. The remainder, shown as 'Other employees', provide services, which may or may not occupy their full time, under contract or in return for payments appropriate to work performed. 'Non-official' post offices are conducted by persons who are not officers of the Australian Postal Commission, and are frequently operated in conjunction with some other business activity.

AUSTRALIAN POSTAL COMMISSION
NUMBERS OF EMPLOYEES AND OFFICES — WESTERN AUSTRALIA

Particulars	At 30 June —					
	1976	1977	1978	1979	1980	1981
Full-time employees —						
Permanent officers	2,053	2,010	2,037	1,989	2,210	2,241
Temporary officers	309	340	321	358	188	183
Total	2,362	2,350	2,358	2,347	2,398	2,424
Other employees —						
Non-official postmasters and staff	396	380	383	367	341	336
Mail contractors (a)	308	319	313	303	321	323
Part-time employees	302	278	290	289	278	286
Total	1,006	977	986	959	940	945
Total, Employees	3,368	3,327	3,344	3,306	3,338	3,369
Post offices —						
Official	162	164	163	160	161	158
Non-official	381	376	376	365	335	329
Total	543	540	539	525	496	487

(a) Includes persons employed by contractors to drive vehicles on mail runs.

The net result of the operations throughout Australia of the Commission for the years ended 30 June 1976 to 1981 are shown in the following table. The amounts appearing under the heading of *Interest* represent interest on funds provided by the Treasury.

AUSTRALIAN POSTAL COMMISSION
STATEMENT OF REVENUE AND EXPENDITURE — AUSTRALIA
(\$'000)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Revenue —						
Mail services	402.221	435.790	456.739	528.978	582.200	668.676
Money order and postal order services	7.481	6.881	6.242	5.434	6.350	7.758
Commission on agency services	85.892	101.739	95.636	93.171	82.189	83.471
Other revenue	10.044	17.186	20.110	18.907	19.442	22.147
Total, Revenue	505.638	561.596	578.727	646.490	690.181	782.052
Expenditure —						
Operating and general (a)	354.995	395.675	426.100	476.915	530.875	625.005
Transportation (b)	46.723	50.168	55.343	44.842	52.744	61.018
Depreciation	7.959	9.341	11.786	13.926	11.934	14.555
Superannuation	43.994	54.253	60.250	65.550	59.500	68.500
Long service leave	13.514	16.383	17.083	18.582	20.588	23.642
Interest	6.791	6.877	6.098	4.086	2.854	2.075
Total, Expenditure	473.976	532.697	576.660	623.901	678.495	794.795
Operating surplus available for appropriation	31.662	28.899	2.067	22.589	11.686	— 12.743

(a) From 1978-79 this item includes the cost of operating the Commission's own motor transport fleet. In previous years this cost was shown as Transportation expenditure. (b) From 1978-79 this item includes only the cost of conveyance of mail by outside agencies. See also footnote (a).

Details of postal articles handled in Western Australia during the years 1975-76 to 1980-81 are shown in the following table.

POSTAL ARTICLES HANDLED (a) — WESTERN AUSTRALIA
(Thousands)

Year	Ordinary postal articles		Parcels (b)	Registered articles (c)
	Standard letters	Non-standard articles		
POSTED FOR DELIVERY WITHIN AUSTRALIA				
1975-76	125.588	16.648	782	310
1976-77	129.828	16.355	1,076	248
1977-78	142.559	15.259	1,433	278
1978-79	153.644	17.854	1,409	260
1979-80	157.217	18.861	1,529	265
1980-81	163.156	20.315	1,799	271
POSTED FOR DELIVERY OVERSEAS				
1975-76	7.016	808	63	87
1976-77	7.229	822	66	82
1977-78	5.950	1,003	72	84
1978-79	5.473	703	80	80
1979-80	7.198	908	92	82
1980-81	8.642	1,088	99	86
RECEIVED FROM OVERSEAS				
1975-76	5.852	3,060	165	100
1976-77	6.397	2,312	160	99
1977-78	7.517	2,374	144	111
1978-79	7.147	2,500	152	96
1979-80	7.252	2,458	144	99
1980-81	6.996	2,168	152	105

(a) Excludes matter received from other Australian States. (b) Includes registered, cash on delivery and duty parcels. (c) Excludes registered parcels: see footnote (b).

Australian Telecommunications Commission

The following table shows the number of persons employed by the Australian Telecommunications Commission in Western Australia at 30 June 1976 to 1981.

AUSTRALIAN TELECOMMUNICATIONS COMMISSION NUMBER OF EMPLOYEES — WESTERN AUSTRALIA

Particulars	At 30 June					
	1976	1977	1978	1979	1980(a)	1981(b)
Full-time employees —						
Permanent officers	5,922	5,779	5,618	6,579	6,493	6,654
Temporary officers	1,544	1,567	1,666	475	483	632
Total	7,466	7,346	7,284	7,054	6,976	7,286
Other employees —						
Part-time employees	177	162	166	161	160	176
Employees paid by other government authorities	27	50	53	44	48	45
Contract employees	97	94	81	81	79	n.a.
Total	301	306	300	286	287	(c) 221
Total, Employees	7,767	7,652	7,584	7,340	7,263	(c) 7,507

(a) At 18 June. (b) At 17 June. (c) Excludes contract employees.

The annual net results of the operations of the Commission throughout Australia for 1975-76 to 1980-81 are shown in the following table. The amounts appearing under the heading of *Interest* represent interest on funds provided by the Treasury.

AUSTRALIAN TELECOMMUNICATIONS COMMISSION PROFIT AND LOSS STATEMENT — AUSTRALIA (\$'000)

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Earnings —						
Telephone rents	416,831	454,111	495,420	533,295	602,655	674,102
Telephone calls	839,580	967,331	1,078,830	1,211,057	1,355,373	1,533,172
Telephone connection fees and rearrangement charges	58,447	77,465	80,719	88,206	102,091	119,556
Telegrams	29,423	31,511	31,303	35,187	32,497	33,005
Telex rents	14,090	16,219	18,655	21,495	25,644	29,830
Telex calls	17,417	20,021	26,081	24,890	28,936	29,345
Other earnings	48,401	108,334	125,490	130,274	133,613	190,430
Total, Earnings	1,424,189	1,674,991	1,856,499	2,044,404	2,280,809	2,609,440
Expenses —						
Maintenance of plant (a)	278,125	355,196	386,723	424,736	576,760	644,515
Operating (a)	236,148	275,278	288,573	307,994	399,873	482,387
General and administrative (a)	62,621	71,520	105,160	137,001	178,739	191,762
Accommodation (a)	50,224	64,678	74,705	85,917	99,382	116,484
Depreciation	312,358	340,817	366,514	410,412	447,383	533,680
Superannuation	70,395	100,381	106,669	118,887	(b)	(b)
Long service leave	22,336	24,090	25,949	30,849	(b)	(b)
Interest	239,588	278,629	317,288	338,090	367,127	408,125
Total, Expenses	1,271,795	1,510,589	1,671,580	1,853,885	2,069,264	2,376,953
Profit	152,393	164,403	184,918	190,519	211,545	232,487

(a) From 1979-80, these expenses also include shares of *Superannuation* and *Long service leave* previously shown separately. (b) See footnote (a).

The total number of employees (excluding contract employees) of the Telecommunications Commission throughout Australia at 17 June 1981 was 92,605.

Figures relating to the cash receipts and expenditure of the Commission in Western Australia during the years 1978-79 to 1980-81 are given in the following table. Some additional items of revenue and expenditure are not apportioned to States and therefore do not appear in the table. The figures shown relate to actual collections and payments made and as such they do not represent the net results of the Commission's operations in Western Australia for the year.

AUSTRALIAN TELECOMMUNICATIONS COMMISSION
CASH RECEIPTS AND EXPENDITURE — WESTERN AUSTRALIA
(\$'000)

Cash receipts				Cash expenditure			
Particulars	1978-79	1979-80	1980-81	Particulars	1978-79	1979-80	1980-81
Telephone	163,155	185,123	211,076	Salaries and wages	82,907	91,926	104,560
Telegraph	6,915	7,742	8,385	Material	36,076	35,322	46,527
Proceeds of sales	1,527	1,190	1,126	Buildings, sites, properties	4,114	5,185	10,074
Recoverable works	1,753	1,781	1,922	Accommodation services	5,309	5,297	6,964
Miscellaneous	—33	—3	28	Other administrative expenses	18,259	18,216	21,484
Total	173,317	195,832	222,537	Total	146,665	155,946	189,609

Telegraphs and Telephones. Telegrams can be lodged at any post office, telephone office or from any public telephone equipped for multi-coin operation. In addition, telegrams can be dispatched from any subscriber's telephone or teleprinter exchange (telex) equipment. The number of telegraph offices in the State and of telegrams transmitted from Western Australia during the years 1975-76 to 1980-81 are set out below.

Telephone services comprise ordinary exchange services (i.e. those which provide direct access to the exchange system by means of exclusive use of an exchange line), duplex services, party-line services, private branch exchange services and public telephones. The numbers shown as 'Telephone instruments in service' relate to those through which direct access to the exchange system may be obtained.

At 30 June 1981, the pair length of conductors in telegraph and telephone cables in Western Australia was 3,159,864 kilometres. The pair length of aerial wires was 62,041 kilometres and the length of pole routes was 19,866. There were 10,167 tube kilometres of coaxial cable.

The teleprinter exchange service (telex) was introduced in Perth in December 1956. This service enables a subscriber's teleprinter to be connected with that of any other subscriber in the local network or networks in other States.

TELEGRAPHS — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of —						
Offices (a)	609	595	584	561	535	514
Telegrams dispatched —	'000	'000	'000	'000	'000	'000
Within Australia	1,502	1,241	1,021	721	533	465
Beyond Australia	176	182	190	186	178	153

(a) At 30 June. For 1979-80, at 18 June. For 1980-81, at 17 June.

TELEPHONES AND EXCHANGES (a) — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of —						
Exchanges	729	723	709	690	687	686
Services —						
Metropolitan (b)	189,369	203,503	254,382	276,035	297,191	322,125
Outer Metropolitan (c)	24,281	28,471				
Country	66,574	71,435		84,279	92,145	102,611
Total	280,224	303,409	331,848	360,314	389,336	424,736
Telephone instruments in service —						
Total	404,041	436,033	472,788	514,460	556,831	609,781
Per 100 of population	35.2	36.8	38.8	41.6	44.6	47.3

(a) At 30 June. For 1979-80, at 18 June. For 1980-81, at 17 June. (b) Services connected to exchanges located within 16 kilometres of the General Post Office, Perth. (c) Services connected to exchanges located between 16 kilometres and 32 kilometres of the General Post Office, Perth.

TELEPRINTER EXCHANGE NETWORK (TELEX) — WESTERN AUSTRALIA

Particulars	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Number of —						
Services at 30 June (a)	1,803	2,034	2,364	2,733	3,205	3,765
Internal calls (b) '000	3,159	3,208	3,602	4,021	4,565	5,071

(a) For 1979-80, at 18 June. For 1980-81, at 17 June. (b) Includes Post Office official traffic.

RADIOCOMMUNICATION

The Overseas Telecommunications Commission (Australia) is the authority responsible for the operation of telecommunication services between Australia and other countries, with ships at sea and to and between Australia's external Territories.

The Commission was established under the provisions of the *Overseas Telecommunications Act 1946* which implemented a recommendation of the 1945 Commonwealth Telecommunications Conference for national ownership of the external telecommunications services of the British Commonwealth countries concerned. In 1966 the Commonwealth countries completed a review of the machinery for their collaboration in telecommunications and, as a result, the Commonwealth Telecommunications Organisation was established. The purpose of this body is to promote the efficient exploitation and development of the Commonwealth external telecommunications system.

A number of countries, including Australia, agreed in 1964 to establish a global commercial communications satellite system and Australia, represented by the Commission, is a member of the management body of the 106 nation International Telecommunications Satellite Consortium (INTELSAT).

The Commission operates three 'standard' earth stations (at Carnarvon in Western Australia, Ceduna in South Australia and Moree in New South Wales) which can communicate via satellite with stations in other countries. The standard station at Carnarvon was brought into service on 1 October 1969, enabling a non-standard earth station at Carnarvon to be released for the full-time performance of telemetry, tracking and command functions for the INTELSAT organisation.

The transmission facilities used by the Commission in its external operations are submarine cables, satellites and high frequency radio. It operates a coastal radio service and, in association with the Telecommunications Commission within Australia and with communication carriers in other Commonwealth and foreign countries, provides public message telegram, telephone, telex, photo-telegram, leased circuit and television services to most countries and places throughout the world.

The coastal radio service provides, as its principal function, essential maritime communications, including distress signals, navigation warnings, air-sea rescue service and radio-medical service messages, meteorological messages and time signals, as well as naval traffic as required. It provides also, by radiotelegraph and radiotelephone, commercial communications with ships at sea and, by radiotelephone, message communication with small vessels. Western Australian coastal radio stations are located at Perth, Broome, Carnarvon, Esperance and Geraldton.

The licensing of civil radiocommunication stations and the transmission of radio messages within Australia are the responsibility of the Australian Telecommunications Commission. The Royal Flying Doctor Service of Australia, to which reference is made in Part 3 of Chapter V, provides general telegraph facilities in remote areas through its extensive radio network.

At 30 June 1980 there were 417,879 civil radiocommunication stations authorised throughout Australia. They comprised 6,795 fixed stations, 26,267 land stations, 370,933 mobile stations, 13,873 amateur stations and 11 space services.

The numbers of each type of radiocommunication station authorised to operate in Western Australia at 30 June 1980 are given in the next table. The following definitions are relevant in considering the figures shown in the table. *Fixed Stations* — Stations established at fixed locations for communication with other stations similarly established. *Outposts* — Stations established in outback areas for communication with control stations such as those of the Royal Flying Doctor Service. *Land Stations* — Stations established at fixed locations for communication with mobile stations. *Coast Stations* — Land stations for communication with ocean-going vessels. *Mobile Stations* — Equipment installed in aircraft (aeronautical), motor vehicles (land mobile services), harbour vessels (harbour mobile services) and ocean-going vessels (ships), and mobile equipment of organisations such as the Royal Flying Doctor Service. *Radiodetermination Stations* — Stations employed for the determination of position, or the obtaining of information relating to position, by means of the propagation of radio waves. *Space Services* — Radiocommunication services, between earth stations and space stations, between space stations or between earth stations when signals are re-transmitted by space stations, or transmitted by reflection from objects in space, excluding reflection or scattering by the ionosphere or within the earth's atmosphere.

CIVIL RADIOCOMMUNICATION STATIONS AUTHORISED AT 30 JUNE 1980

Type of station	Number	Type of station	Number
Transmitting and receiving —		Transmitting and receiving — <i>cont.</i>	
Fixed stations —		Mobile stations —	
Aeronautical	19	Aeronautical	744
Services with other countries	15	Land mobile services	38,707
Outpost	378	Harbour mobile services	1,712
Other	349	Outpost	888
Land stations —		Radiodetermination	84
Aeronautical	74	Ship	2,078
Base stations —		Earth and space services	2
Land mobile services	3,104	Amateur	980
Harbour mobile services	130		
Coast	95	Total	49,521
Experimental	118	Receiving only (fixed)	129
Repeater	44		
		GRAND TOTAL	49,650

BROADCASTING AND TELEVISION

The Australian Broadcasting Tribunal is constituted by the *Broadcasting and Television Act* 1942, and consists of a minimum of three and a maximum of six full-time members.

The Tribunal has responsibility for the general oversight of licensed broadcast and television services and determines the standards to be observed by licensees in respect of the broadcasting or televising of programmes, the conditions under which advertisements may be broadcast or televised and the hours during which programmes may be transmitted. The Tribunal is required to hold public inquiries into applications for licences for commercial broadcasting and television stations for areas for which it proposes to grant licences.

Under the Broadcasting and Television Act, the Minister for Communications has the power to determine the situation, operating power and operating frequencies of broadcasting and television stations.

The Australian Broadcasting Commission, which is also constituted under the *Broadcasting and Television Act* 1942, controls the activities of, and provides programmes for, the National Broadcasting Service and the National Television Service which use transmitters operated on behalf of the Minister for Communications. The operations of the Australian Broadcasting Commission are financed by appropriations made by the Commonwealth Parliament.

The income of licensees of commercial broadcasting and television stations is derived from advertisements and other forms of publicity.

The income of licensees of public broadcasting stations is derived from a variety of sources including limited sponsorship announcements, government grants, charges for time allocated to participating groups, membership fees and sale of publications.

The initial period of a licence granted by the Tribunal is a maximum of five years, and renewals are granted for a maximum of three years after examination of the performance of the licensee.

Public broadcasting and television services operate on a non-profit basis and may be licensed to provide services for people within a specified area or community, or to provide programmes having a specified nature or purpose.

Broadcasting and Television Stations

In 1923, the first radio broadcasting station commenced operations in Australia and, in the following year, station 6WF (Westralian Farmers) opened in Perth. The following table shows details of stations operating in Western Australia at 30 June 1981. At that date there were twenty-three national, seventeen commercial and three public broadcasting stations in the State.

BROADCASTING STATIONS AT 30 JUNE 1981

NATIONAL STATIONS				COMMERCIAL STATIONS			
Type and location	Call sign	Frequency (kHz)	Hours of service per week (a)	Type and location	Call sign	Frequency (kHz)	Hours of service per week (a)
Medium frequency —				Medium frequency —			
Perth	6WF	720	133	Perth	6IX	1,080	168
Perth	6WN	810	133	Perth	6KY	1,206	168
Albany	6AL	630	133	Perth	6PM	990	168
Broome	6BE	675	133	Perth	6PR	882	168
Busselton	6BS	684	133	Albany	6VA	783	133
Carnarvon	6CA	846	133	Bridgetown	6BY	900	133
Dalwallinu	6DL	531	133	Bunbury	6TZ	963	131
Derby	6DB	873	133	Collie	6CI	1,134	131
Esperance	6ED	837	133	Dampier/Karratha/Roebourne	6KA	1,260	123
Exmouth	6XM	1,188	133	Geraldton	6GE	1,008	117
Geraldton	6GN	828	133	Kalgoorlie	6KG	981	126
Kalgoorlie	6GF	648	133	Katanning	6WB	1,071	133
Kununurra	6KW	756	133	Merredin	6MD	1,098	121
Newman	6MN	567	133	Narrogin	6NA	918	131
Northam	6NM	612	133	Northam	6AM	864	168
Paraburdoo	6PU	567	133	Port Hedland	6NW	1,026	123
Port Hedland	6PH	603	133	Frequency modulation —			
Tom Price	6TP	567	133	Perth	6NOW	(c) 96.1	168
Wagin	6WA	558	133				
Wyndham	6WH	1,017	133				
High frequency —							
Perth	VLW	(b)	133	Medium frequency —			
Frequency modulation —				Perth (e)	6NR	927	107
Perth	ABC-FM	(c) 97.5	168	Frequency modulation —			
Bunbury	ABC-FM	(c) 93.3	168	Perth (f)	6UVS	(c) 92.1	127
				Newman	6NEW	(c) 92.9	168

(a) To the nearest hour. (b) The station operates two transmitters, of 10,000 and 50,000 watts. Frequencies are varied as required to obtain optimum results. (c) Frequency is shown in megahertz (MHz). (d) Stations licensed under the *Wireless Telegraphy Act 1903*. (e) Operated by the Western Australian Institute of Technology. (f) Operated by the University of Western Australia.

Television commenced in Australia on 16 September 1956 when station TCN, Sydney began regular transmission. Colour television was introduced officially into Australia on 1 March 1975. By 30 June 1981 the number of stations in operation had increased to a total of 135, comprising eighty-five national stations and fifty commercial stations.

The first television station in Western Australia commenced full-scale transmission in Perth on 16 October 1959 and, at 30 June 1981 three metropolitan and nineteen country television stations were operating in the State. Details are shown in the following table, in which particulars are given of both national and commercial stations.

TELEVISION STATIONS AT 30 JUNE 1981

Call sign and channel	Area served	Location of transmitter	Hours of service per week (a)	Date of commencement of operations (b)
NATIONAL STATIONS				
ABW-2	Perth	Bickley	87	7 May 1960
ABAW-2	Southern Agricultural	Mount Barker	87	6 June 1966
ABCW-5A	Central Agricultural	Mawson Trig	87	28 March 1966
ABCMW-8	Morawa	Billerranga Hills	87	8 March 1975
ABCNW-7	Carnarvon	Carnarvon	87	30 June 1972
ABDW-10	Dampier	Dampier	87	17 December 1973
ABEW-10	Esperance	Microwave Terminal Wireless Hill	87	21 October 1974
ABGW-6	Geraldton	Geraldton	87	8 December 1969
ABKAW-7	Karratha	Karratha	87	17 December 1973
ABKW-6	Kalgoorlie	Kalgoorlie	87	27 January 1970
ABMW-10	Moora	Quarrell Range	87	30 September 1974
ABNW-7	Norseman	Norseman Microwave Repeater	87	14 April 1971
ABPHW-7	Port Hedland	Port Hedland	87	3 October 1973
ABRBW-9	Roebourne	Roebourne	87	17 December 1973
ABSW-5	Bunbury	Mount Lennard	87	10 May 1965
ABSBW-9	Southern Cross-Bullfinch	Ghooli Microwave Repeater	87	16 July 1973
COMMERCIAL STATIONS				
STW-9	Perth	Bickley	144	12 June 1965
TVW-7	Perth	Bickley	118	16 October 1959
BTW-3	Bunbury	Mount Lennard	69	10 March 1967
GSW-9	Southern Agricultural	Mount Barker	69	23 August 1968
GTW-11	Geraldton	Geraldton	40	21 January 1977
VEW-8	Kalgoorlie	Kalgoorlie	43	18 June 1971

(a) To the nearest hour.

(b) Date on which full-scale transmission began.

Television transmissions by means of either a repeater station or a translator station are provided to some areas of the State not served by the stations shown in the previous table. Repeater stations are stations of low operating power designed to transmit only programmes recorded on magnetic tape. At 30 June 1981 television repeater stations were operating at Cockatoo Island, Koolan Island, Leinster, Mount Nameless, Mount Tom Price, Newman and Paraburdoo. Translator stations are low-powered stations which receive signals from a parent station or another translator station and re-transmit those signals on a different frequency channel. They serve mainly isolated areas where there is not satisfactory reception from high-powered stations.

TELEVISION TRANSLATOR STATIONS AT 30 JUNE 1981

Area served	Location of transmitter	Parent station	
		Call sign and channel	Area served
NATIONAL STATIONS			
Albany	Mount Clarence	ABAW-2	Southern Agricultural
Broome	Broome (<i>a</i>)	ABW-2	Perth
Derby	Derby (<i>a</i>)	ABW-2	Perth
Exmouth	Exmouth (<i>a</i>)	ABW-2	Perth
Halls Creek	Halls Creek (<i>a</i>)	ABW-2	Perth
Kambalda	Red Hill	ABKW-6	Kalgoorlie
Katanning	Fairfield Microwave Repeater Station	ABW-2	Perth
Koolyanobbing	Wundowie Hills	ABSBW-9	Southern Cross-Bullfinch
Kununurra	Kelly Knob (<i>a</i>)	ABW-2	Perth
Leeman	Leeman (<i>a</i>)	ABW-2	Perth
Marble Bar	Marble Bar (<i>a</i>)	ABW-2	Perth
Merredin	Radio Telephone Site	ABW-2	Perth
Mullewa	Mullewa	ABGW-6	Geraldton
Narrogin	Narrogin Microwave Repeater Site	ABW-2	Perth
Newman	TV Hill	ABW-2	Perth
Onslow	Onslow (<i>a</i>)	ABW-2	Perth
Pannawonica	Pannawonica	ABW-2	Perth
Ravensthorpe	Public Works Department Water Reserve (<i>a</i>)	ABW-2	Perth
Salmon Gums	Red Lake	ABW-2	Perth
Wagin	Mount Latham Microwave Repeater Station	ABW-2	Perth
Wongan Hills	Wongan Hills	ABMW-10	Moora
Wyndham	Mount Albany (<i>a</i>)	ABW-2	Perth
COMMERCIAL STATIONS			
Albany	Mount Clarence	GSW-9	Southern Agricultural
Kambalda	Red Hill	VEW-8	Kalgoorlie
Katanning	Fairfield Microwave Repeater Site	BTW-3	Bunbury
Mawson	Mawson National Transmitter Site	BTW-3	Bunbury
Narrogin	Narrogin Microwave Repeater Site	BTW-3	Bunbury
Northam	Northam	BTW-10	Bunbury
Wagin	Mount Latham Microwave Repeater Site	BTW-3	Bunbury

(a) Satellite fed.

CHAPTER X — INDUSTRIAL CONDITIONS, EMPLOYMENT AND PRICES

Part 1 — Industrial Conditions

INDUSTRIAL AUTHORITIES

Federal Authorities

Federal Court of Australia. The Federal Court of Australia, as constituted by the *Federal Court of Australia Act* 1976 consists of a Chief Judge and such other Judges as are appointed under the Act, and comprises an Industrial Division and a General Division. The Industrial Division deals with all proceedings under the Conciliation and Arbitration Act and related legislation. The Federal Court of Australia Act provides that, except in respect of certain specified situations, the jurisdiction of the Industrial Division shall be exercised by a Full Court comprising not less than three Judges. A single Judge may refer a question of law for the opinion of a Full Court. The Australian Conciliation and Arbitration Commission may also refer a question of law for the opinion of the Court. Appeal from a judgment of a Full Court may, in certain circumstances, be made to the High Court of Australia.

Australian Conciliation and Arbitration Commission. The Australian Conciliation and Arbitration Commission, according to the provisions of the *Conciliation and Arbitration Act* 1904, comprises a President and such numbers of Deputy Presidents and of Commissioners 'as are necessary from time to time'. The President and the Deputy Presidents are described as 'Presidential Members' of the Commission. The powers of the Commission include the prevention or settlement, by conciliation or arbitration, of industrial disputes which extend beyond the limits of any one State, but the Commission is authorised to conciliate or arbitrate in respect of any dispute or industrial matter associated with Commonwealth Government undertakings or projects. A Full Bench of the Commission consists of not less than three members, including at least two Presidential Members. The power to make awards or certify agreements making provision for, or altering, standard hours, rates of wages (including a minimum wage), annual leave or long service leave is exercisable only by a Full Bench, except where the provision or alteration gives effect to matters, or is in accordance with principles, determined by a Full Bench. The Principal Registry of the Commission is in Melbourne, Victoria, and there is a Deputy Industrial Registrar in each State.

Western Australian Authorities

A Court of Arbitration was established in Western Australia in 1901 under the provisions of the *Industrial Conciliation and Arbitration Act* 1900. The Court of Arbitration was replaced, with effect from 1 February 1964, by the Western Australian Industrial Appeal Court and The Western Australian Industrial Commission, authorities constituted in terms of the *Industrial Arbitration Act* 1912-1977. These authorities continue to operate under the provisions of the *Industrial Arbitration Act* 1979-1981 which was proclaimed on 1 March 1980.

Western Australian Industrial Appeal Court. The Western Australian Industrial Appeal Court consists of three Judges, one of whom is the Presiding Judge. The members are nominated by the Chief Justice of Western Australia. An appeal lies to the Court from decisions of the President of the Western Australian Industrial Commission, the Full Bench or the Commission in Court Session but only on the ground that the decision is erroneous in law or is in excess of jurisdiction.

The Western Australian Industrial Commission. The Western Australian Industrial Commission consists of a President, a Chief Industrial Commissioner, a Senior Commissioner, and 'such number of other Commissioners as may, from time to time, be necessary'. There were five 'other Commissioners' at 1 March 1982. A person shall not be appointed as President unless he is qualified to be a Judge, and on appointment he is entitled to the status of a Puisne Judge. The President or a Commissioner sitting or acting alone constitutes the Commission and may exercise the appropriate powers of the Commission.

The Commission can inquire into any industrial matter and make an award, order or declaration relating to such matter. 'Industrial matter' means any matter affecting or relating to work, privileges, rights, or duties of employers or employees in any industry and includes any matter relating to the wages, salaries, allowances, or other remuneration of employees or the prices to be paid in respect of their employment; the hours of employment, sex, age, qualification or status of employees and the mode, terms and conditions of employment including conditions which are to take effect after the termination of employment. The Commission may also make inquiries where industrial action has occurred or is likely to occur.

The Commission in Court Session is constituted by not less than three Commissioners sitting or acting together, and may make General Orders, hear matters referred by the Commission, and hear appeals from decisions of Boards of Reference.

The Full Bench is constituted by not less than three members of the Commission, one of whom is the President, and may hear matters referred by the Commission on questions of law, and appeals from decisions of the Commission and Industrial Magistrates.

The following table shows details of the number of industrial awards, unions and members registered with The Western Australian Industrial Commission under the *Industrial Arbitration Act 1979-1981*.

INDUSTRIAL AWARDS, UNIONS AND MEMBERS REGISTERED

Particulars	At 30 June —					
	1977	1978	1979	1980	1981	1982
Awards in force	414	393	355	494	459	483
Consent agreements in force (a)	180	205	135	(b)	(b)	(b)
Unions of workers —						
Number	80	77	77	74	68	69
Membership	185,186	184,578	192,056	181,409	170,414	171,912
Unions of employers —						
Number	15	15	14	14	14	14
Membership	2,021	2,156	2,102	2,040	2,139	2,142

(a) Named as *Industrial Agreements* prior to 1980.

(b) Included in *Awards in force*.

Western Australian Coal Industry Tribunal. The Western Australian Coal Industry Tribunal, as constituted under the *Western Australian Coal Industry Tribunal Act 1978*, consists of five members appointed by the Governor. One member is chairman of the Tribunal, and there are two members representing employees, and two representing employers. The Tribunal has power to consider and determine industrial disputes, not extending beyond the limits of the State, and other matters relating to the coal-mining industry.

EMPLOYER ORGANISATIONS

The first employers' organisation in Western Australia was the West Australian Chamber of Commerce which was founded in 1853 and was replaced by the Fremantle Chamber of Commerce in 1873. The Perth Chamber of Commerce (Incorporated) was founded in 1890. Other Chambers of Commerce operate in various parts of the State.

The two major organisations representative of employers in industrial relations matters are the Confederation of Western Australian Industry (Incorporated) and the Australian Mines and Metals Association (Incorporated).

The Confederation of Western Australian Industry (Incorporated) has 7,000 individual members and 101 affiliated trade, industry and professional associations. It is the merged body of the former Western Australian Employers' Federation and the West Australian Chamber of Manufactures. The former was founded in 1913 to handle labour relations for private industry throughout the State and the latter began in 1890 but disbanded and was formed again in 1899. The Confederation is controlled by a Board elected by its members and representative of its Labour Relations Council, Manufacturing Industry Council and Committee of Affiliated Associations.

The Australian Mines and Metals Association (Incorporated) is an association of mining companies which was established in Victoria in 1918 and opened a branch office in Western Australia in 1968. Its activities are mainly directed to the industrial relations interests of its members in the mining and allied industries (including hydrocarbons).

Both the Confederation of Western Australian Industry (Incorporated) and the Australian Mines and Metals Association represent employers in all aspects of the negotiation of industrial awards and agreements, in the settlement of industrial disputes, including arbitration, and in direct relationships with the trade unions. Both are members of the Confederation of Australian Industry (C.A.I.) which came into existence on 1 December 1977 and replaced the Associated Chambers of Manufactures and the Australian Council of Employers' Federation. Through C.A.I. they have overseas affiliation with the International Organisation of Employers.

EMPLOYEE ORGANISATIONS

The trade unions in Western Australia cover all forms of occupations from the unskilled to the professional worker. The great majority of union organisations are national in character with State branches registered with both the Federal and State industrial authorities.

Major organisations are the Trades and Labor Council of Western Australia, the Australian Public Service Federation, and the Grand Council of Government Salaried Officers' Industrial Organisations of Western Australia. These three groups cover most of the wage and salary earners employed in the private and governmental sectors of industry and commerce.

The Trades and Labor Council of Western Australia, which is the State branch of the Australian Council of Trade Unions (A.C.T.U.), has provincial councils at Geraldton and Port Hedland. At 30 June 1981 it had affiliated with it eighty State resident unions having a membership of approximately 132,000.

The Trades and Labor Council, representing the largest group of wage and salary earners, frequently acts on behalf of employees in matters before the Western Australian industrial authorities such as wages, hours, holidays, long service leave, and other associated matters of a standard or uniform nature.

The next table gives particulars of the number of trade unions in Western Australia and the number of members at the end of December for the years 1976 to 1981. The table also shows the estimated percentage of trade union members to total wage and salary earners in employment. Figures for 1976 to 1979 are based on estimates of employees as published by the Australian Statistician in *Civilian Employees, Australia* (Catalogue No. 6213.0). As this series was suspended as from April 1980 the proportions of total employees shown for 1980 and 1981 have been calculated by using estimates of employees from the labour force survey. For purposes of comparison figures for December 1979 have been shown on both bases. The percentages should be regarded as giving only a broad indication of the extent of union membership among wage and salary earners because they are based on estimates of *employed* wage and salary earners that are subject to revision. The degree of unemployment among reported union members would affect the percentages for a particular year and comparisons between years.

TRADE UNIONS — NUMBERS AND MEMBERSHIP

Date	Number of unions	Number of members ('000)			Proportion of total wage and salary earners (a) (per cent)		
		Males	Females	Persons	Males	Females	Persons
End of December —							
1976 (b) r	149	160.3	72.7	233.0	59	47	54
1977 (b) r	153	162.7	76.3	238.9	59	48	55
1978 (b) r	153	160.0	74.9	234.8	59	46	54
1979 (b) r	153	158.1	78.7	236.7	57	47	54
1979 (c)	153	158.1	78.7	236.7	58	48	54
1980 (c)	150	158.8	75.9	234.7	55	44	51
1981 (c) p	149	156.4	72.7	229.1	54	42	50

(a) Approximate; see text preceding table.

(b) Based on estimates as published in *Civilian Employees, Australia* (Catalogue No. 6213.0).

(c) Based on estimates from the Labour Force Survey.

APPRENTICESHIP AND INDUSTRIAL TRAINING

The first registration of an apprentice in Western Australia was made on 25 May 1903 to the trade of book binding. At 30 June 1981 the total number of apprentices registered in this State was 13,394 in a wide variety of trades.

Prior to 6 February 1978, all industrial aspects of apprenticeship were under the jurisdiction of The Western Australian Industrial Commission, as provided for by the *Industrial Arbitration Act 1912-1977*.

The Industrial Training Act of 1975 was proclaimed on 6 February 1978. The provisions of this Act and associated regulations prescribe the administrative processes and conditions relating to the trades to which persons can be indentured; the duration of apprenticeship; the prerequisites for entry into trades and criteria for terms shorter than the maximum; the mode and duration of technical training attendance; and the examination and certification of apprentices.

The Act established the Industrial Training Advisory Council as the principal advisory body to the Government on matters relating to industrial training. The Council comprises seven members representing the Department of Labour and Industry, the Confederation of Western Australian Industry (Incorporated), the Trades and Labor Council of Western Australia, the Technical Education Division of the Education Department and a State instrumentality. It is responsible for the overall co-ordination of industrial training arrangements in Western Australia.

An industrial training advisory board in respect of each trade or group of trades which is prescribed as an apprenticeship trade or an industrial training trade is appointed to assist the Council. It also deals with apprenticeship matters relevant to the trade it is appointed to review.

The Act also allows for a trade or group of trades to be defined by regulation as a 'special' trade in which case an apprentice or industrial trainee is indentured to the industrial training advisory board appointed in relation to that trade and is placed with an employer by that board. The bricklaying, stonemasonry, plastering and tiling apprenticeship trades have each been prescribed as a 'special' trade.

An apprenticeship is an agreement which covers the period of time during which an apprentice is contracted to an employer to learn all phases of a trade. It is a form of on-the-job training, and combines practical experience at work with further training at technical school. An apprentice is any person bound to an employer or an industrial training advisory board to learn an apprenticeship trade prescribed under the Act. There is no minimum age prescribed although, in practice, the minimum age is the school leaving age which is at the end of the year during which the student turns fifteen. At 30 June 1982 ninety-one trades had been prescribed as apprenticeship trades. Apprentices or industrial trainees are employed on probation for a period between three and six months. This period counts as service if the person subsequently becomes an apprentice or industrial trainee in that trade. Under certain circumstances, the employment of an apprentice or industrial trainee may be transferred from

one employer to another. Every apprentice or industrial trainee is required to regularly attend classes and obtain such instruction and training as is approved by the Council for that trade. Apprenticeships may be for a period of 3, 3½, 4 or 5 years. Where a minor satisfactorily completes an approved pre-apprenticeship course conducted by the Technical Education Division of the Education Department, the period of apprenticeship may be 'three years'.

The following table shows the number of new registrations effected during the twelve months ended 30 June 1981, together with the total number of apprentices registered in this State at the end of that period.

**APPRENTICESHIP — NEW REGISTRATIONS AND
NUMBER OF EFFECTIVE REGISTRATIONS TO VARIOUS TRADES**

Trade	Registrations effected during year ended 30 June 1981	Effective registrations at 30 June 1981
Building trades —		
Bricklaying	73	160
Carpentry and joinery	285	800
Glazing	31	71
Painting and decorating	79	241
Plastering	20	50
Plumbing	136	500
Other	46	104
Electrical trades —		
Automotive electrical fitting	39	119
Electrical (aircraft)	—	2
Electrical fitting	331	892
Electrical installing	189	589
Radio and television servicing	25	82
Food Trades —		
Baking	42	97
Cooking	134	360
General butchering	124	389
Pastry cooking	31	71
Other	6	6
Metal trades —		
Boilermaking	202	416
Boilermaking and first class welding	229	468
First class machining	20	58
First class welding (boilermaking)	61	77
First class welding (engineering)	70	193
Fitting	253	674
Fitting and first class machining	175	332
Fitting and turning	168	576
Ground engineering (aircraft)	17	52
Instrument fitting	42	130
Jobbing, moulding and coremaking	15	60
Motor mechanics	506	1,734
Plant mechanics (industrial)	103	142
Refrigeration fitting	59	211
Sheetmetal	120	332
Steel construction and first class welding	23	55
Turning and first class machining	17	57
Other	105	313
Printing trades —		
Composing	11	60
Printing machining	21	83
Other	45	158
Vehicle building trades —		
Bodymaking	31	120
Bodymaking and first class welding (vehicle building)	10	43
Painting (vehicle building)	60	197
Panel beating	54	232
Other	12	43
Other trades —		
Cabinetmaking	147	418
Horticulture	55	160
Ladies hairdressing	325	926
Male hairdressing	27	99
Upholstering	22	58
Woodmachining	38	95
Other	108	289
GRAND TOTAL	4,742	13,394

The Act also establishes a Division of Industrial Training in the Department of Labour and Industry to administer prescribed aspects of industrial training, and, through the Registrar of Industrial Training, to maintain a Register of Apprentices and a Register of Industrial Trainees. The Western Australian Industrial Commission retains responsibility for remuneration, working conditions and settlement of industrial disputes arising out of matters of apprenticeship and industrial training.

Federal awards are of less significance than State awards in apprenticeship matters in Western Australia. Section 52 of the Conciliation and Arbitration Act enables the Australian Conciliation and Arbitration Commission to issue awards covering the rates of pay and conditions of employment of apprentices. A number of such awards provide that Statutes or Regulations relating to apprenticeships in force in the State in which the apprentice is employed shall apply, except where they are inconsistent with the terms of the award.

INCIDENCE OF INDUSTRIAL AWARDS

The next table indicates the approximate proportions of Western Australian employees covered by awards, determinations and registered industrial agreements under Federal and State jurisdiction. The proportions not so covered (including those working under unregistered industrial agreements) are also shown. The figures summarise part of the data obtained from surveys of the Australian wage structure in May 1963, May 1968, May 1974 and May 1976.

PROPORTION OF EMPLOYEES AFFECTED BY AWARDS, ETC. (a)
(Per cent)

Survey	Males				Females				Persons			
	Employees affect- ed by awards, etc.		Other employ- ees	Total	Employees affect- ed by awards, etc.		Other employ- ees	Total	Employees affect- ed by awards, etc.		Other employ- ees	Total
	Federal	State			Federal	State			Federal	State		
May 1963	13.3	76.5	10.2	100.0	14.8	74.4	10.8	100.0	13.6	76.0	10.4	100.0
May 1968	16.9	70.7	12.4	100.0	15.7	76.1	8.2	100.0	16.6	72.1	11.3	100.0
May 1974	18.8	64.1	17.1	100.0	14.5	76.0	9.6	100.0	17.4	68.0	14.7	100.0
May 1976	20.1	64.3	15.7	100.0	13.9	78.2	7.8	100.0	18.0	69.0	12.9	100.0

(a) Awards or determinations of, and collective agreements registered with, Federal or State industrial authorities.

The estimates shown in the table were derived from returns collected from:

- (i) a stratified random sample of most private employers subject to pay-roll tax;
- (ii) all public hospitals and marketing boards;
- (iii) all Commonwealth Government and State Government departments and semi-government authorities; and
- (iv) a stratified random sample of local government bodies.

For further information relating to these statistics the reader is referred to the publication *Incidence of Industrial Awards, Determinations and Collective Agreements, May 1974* (Catalogue No. 6315.0), published by the Australian Statistician, Canberra.

For a number of reasons, the results of the four surveys are not strictly comparable, and the statistics presented in the previous table should therefore be regarded as providing only a broad indication of trends.

The term 'awards, etc.' as used in the table means awards or determinations of, and agreements registered with, Federal or State industrial authorities. Changes in the proportions of employees reported as affected by Federal awards and by State awards reflect changes in industry and occupational structure, including the creation of new industries; changes in the coverage of individual Federal and State awards; and the creation of new awards relating to employees not previously affected by awards.

INDUSTRIAL DISPUTES

Statistics of industrial disputes are compiled by the Australian Statistician from data obtained from the following sources: direct collections from employers and trade unions concerning individual disputes; reports from government departments and authorities; reports of State and Federal industrial authorities; and information contained in trade journals, employer and trade union publications, and newspaper reports.

INDUSTRIAL DISPUTES (a)

Year	Number of disputes	Number of workers involved			Number of working days lost	Estimated loss in wages
		Directly	Indirectly (b)	Total		
		'000	'000	'000	'000	\$'000
1976	250	92.4	8.3	100.7	252.1	8,461.9
1977	229	49.1	5.8	54.9	220.5	8,582.0
1978	306	70.5	5.7	76.2	197.9	7,736.0
1979	252	166.7	2.9	169.6	348.1	14,118.0
1980	368	62.2	7.2	69.4	191.0	9,615.0
1981	364	65.9	7.0	72.9	244.0	13,796.5

(a) Excludes disputes involving cessation of work of less than 10 man-days.

(b) Persons thrown out of work at the establishments where the stoppages occurred, but not themselves parties to the dispute.

INDUSTRIAL DISPUTES (a) — INDUSTRIES: 1981

Industry (b)	Disputes	Workers involved (c)	Working days lost	Estimated loss in wages
	No.	'000	'000	\$'000
Agriculture, forestry, fishing and hunting	1	0.2	0.2	20
Mining —				
Coal mining	—	—	—	—
Other mining	259	38.4	140.8	8,510
Manufacturing —				
Food, beverages and tobacco	4	0.8	3.4	158
Textiles: Clothing and footwear	1	0.3	1.7	51
Wood, wood products and furniture	1	0.1	0.2	6
Paper and paper products, printing and publishing	4	0.4	0.8	49
Chemical, petroleum and coal products	2	—	0.3	15
Metal products, machinery and equipment	5	3.3	6.0	388
Other manufacturing	6	0.3	2.5	130
Electricity, gas and water	4	1.0	0.5	27
Construction	18	4.6	27.8	1,523
Wholesale and retail trade	2	1.0	8.2	386
Transport and storage: Communication —				
Railway transport: Air transport	6	1.3	2.4	103
Water transport —				
Stevedoring services	15	4.4	5.1	272
Water transport (except stevedoring services)	7	0.7	4.1	215
Road transport: Other transport and storage: Communication	13	7.9	27.2	1,279
Entertainment, recreation, restaurants, hotels and personal services	2	0.3	0.8	31
Other industries (d)	14	7.7	12.1	634
Total	364	72.7	244.1	13,797

(a) Excludes disputes involving cessation of work of less than 10 man-days. (b) The statistics in this table are compiled on the basis of the *Australian Standard Industrial Classification*, 1978 edition. (c) Includes workers involved directly and indirectly; those indirectly involved are persons thrown out of work at the establishments where the stoppages occurred, but not themselves parties to the dispute. (d) Includes Finance, insurance, real estate and business services; Public administration and defence and Community services.

In the two previous tables details of industrial disputes in Western Australia during the years 1976 to 1981 are given, together with an analysis, according to industry group, of disputes which were in progress in 1981. The statistics exclude disputes involving stoppages of work of less than ten man-days in the establishment where the stoppage occurred. Effects on the other establishments resulting from lack of materials, disruption of transport services, power cuts, etc. are not measured by these statistics.

Particulars of all disputes in progress during the year are included in the annual figures, whether the dispute commenced in that year or was in progress at the beginning of the year. Consequently, details of 'the number of disputes' and 'workers involved' in disputes which commenced in any year, and were still in progress during the following year, are included in the figures for both years.

Particulars of some stoppages (e.g. those involving a large number of establishments) may be estimated and the statistics therefore should be regarded as giving a broad measure of the extent of stoppages of work (as defined).

The table below gives an analysis of disputes which were resolved during 1981, according to duration of stoppages.

INDUSTRIAL DISPUTES ACCORDING TO DURATION: 1981

Duration (working days)	Mining	Manu- facturing	Con- struction	Steve- doring	Other Industries	All Industries
NUMBER OF DISPUTES (a)						
Up to 1 day	106	4	4	9	22	145
Over 1 and up to 2 days	67	5	—	4	5	81
Over 2 and up to 3 days	26	2	1	1	5	35
Over 3 but less than 5 days	20	3	2	1	7	33
5 to less than 10 days	21	7	7	—	8	43
10 to less than 20 days	16	2	2	—	2	22
20 to less than 40 days	2	—	1	—	—	3
40 days and over	1	—	—	—	—	1
Total	259	23	17	15	49	363
WORKERS INVOLVED (b)						
Up to 1 day	12,262	1,960	914	2,574	11,269	28,979
Over 1 and up to 2 days	7,050	1,010	—	1,011	2,012	11,083
Over 2 and up to 3 days	5,272	86	500	833	458	7,149
Over 3 but less than 5 days	5,489	914	319	24	2,398	9,144
5 to less than 10 days	5,132	1,214	1,518	—	4,069	11,933
10 to less than 20 days	3,111	72	789	—	9	3,981
20 to less than 40 days	58	—	57	—	—	115
40 days and over	46	—	—	—	—	46
Total	38,420	5,256	4,097	4,442	20,215	72,430
WORKING DAYS LOST ('000 MAN-DAYS)						
Up to 1 day	5.8	1.4	0.8	1.5	8.5	17.9
Over 1 and up to 2 days	10.2	1.0	—	1.4	2.6	15.2
Over 2 and up to 3 days	12.8	0.2	1.5	2.1	1.2	17.9
Over 3 but less than 5 days	22.1	3.3	1.3	0.1	8.5	35.2
5 to less than 10 days	39.9	8.5	12.2	—	34.7	95.3
10 to less than 20 days	46.9	0.9	9.0	—	0.2	56.9
20 to less than 40 days	1.2	—	1.9	—	—	3.1
40 days and over	1.8	—	—	—	—	1.8
Total	140.8	15.1	26.6	5.1	55.5	243.2
ESTIMATED LOSS IN WAGES (\$'000)						
Up to 1 day	344.6	64.8	39.4	82.3	464.7	995.8
Over 1 and up to 2 days	631.4	56.6	—	72.8	128.5	889.4
Over 2 and up to 3 days	857.6	8.4	75.0	111.0	54.6	1,106.6
Over 3 but less than 5 days	1,342.9	226.7	74.4	5.6	419.5	2,069.0
5 to less than 10 days	2,257.1	409.5	709.0	—	1,625.5	5,001.1
10 to less than 20 days	2,808.6	44.3	479.7	—	7.8	3,340.4
20 to less than 40 days	71.1	—	135.0	—	—	206.1
40 days and over	196.9	—	—	—	—	196.9
Total	8,510.2	810.3	1,512.4	271.7	2,700.6	13,805.3

(a) Excludes disputes involving cessation of work less than 10 man-days. (b) Includes workers indirectly involved, i.e. persons thrown out of work at the establishments where the stoppages occurred, but not themselves parties to the disputes.

WAGES AND EARNINGS

Determination of Rates of Pay

The awards and determinations of the various Federal and State tribunals prescribe minimum rates of pay, standard hours of work and other conditions of employment for particular occupations. Most awards also prescribe a minimum wage for adult males and adult females, i.e. the minimum amount which must be paid to an adult employee, regardless of occupation, for working the standard weekly hours of work. In all awards the minimum wage is the same amount for adult females and adult males. In recent years the wage-fixing principles of the Australian Conciliation and Arbitration Commission have generally been followed by State tribunals.

In April 1975 the Australian Conciliation and Arbitration Commission decided to introduce wage indexation in the form of quarterly adjustments to award wages based on increases in the Consumer Price Index. These increases were applied to all rates of pay prescribed in awards of the Commission, including rates of minimum wage for adult males and adult females. In addition, a further increase of \$5 per week was added to the minimum wage in April 1976.

State tribunals generally have granted similar wage increases to those of the Australian Conciliation and Arbitration Commission, including wage indexation increases. For details of increases in Federal and State awards and determinations, and for rates of minimum wage for adult males and adult females, see tables in the following pages.

Minimum Wage Rates

In its decision on the Basic Wage, Margins and Total Wage Case 1966, the Australian Conciliation and Arbitration Commission decided that adult male employees covered by Federal awards should receive a minimum wage of \$36.55 from 11 July 1966.

In its decision in the National Wage Case 1974, the Australian Conciliation and Arbitration Commission, in prescribing a minimum wage for adult females, also made provision for parity between the minimum wage for adult males and adult females to be achieved in three stages: 85 per cent of the male minimum wage to be paid to adult females from the beginning of the first pay-period commencing on or after 23 May 1974; 90 per cent from the beginning of the pay-period in which 30 September 1974 falls; and 100 per cent from the beginning of the pay-period in which 30 June 1975 occurs. The minimum weekly wage payable to adult males was increased from \$60.10 to \$68.10 with effect from the beginning of the first pay-period commencing on or after 23 May 1974. The minimum weekly wage payable to adult females from that date was therefore \$57.90 (i.e. $0.85 \times \$68.10$).

The Western Australian Industrial Commission adopted the minimum wage concept in 1967 when it determined a minimum wage of \$36.55, with effect from 5 April 1967, in respect of adult males employed under specified awards and agreements. In terms of orders operative from 31 May 1974, the Commission introduced for adult females employed under specified awards and agreements a minimum wage of \$57.90 per week. In a further order operative from 16 November 1981 the Commission decided that where a minimum wage was prescribed in an award (specified in an attached schedule) that wage would apply to all adult employees.

The following table shows variations in the minimum weekly wage rates applicable to adult workers under Federal and State awards. Between July 1966 and January 1981, the minimum weekly wage rate prescribed in Federal awards for adult male workers in Perth increased from \$36.55 to \$139.90.

MINIMUM WEEKLY WAGE RATES
FEDERAL AND STATE AWARDS
(\$)

Federal awards		State awards	
Perth		Western Australia	
Date of operation	Amount	Date of operation	Amount
Adult males (a) —		Adult males —	
1966 — 11 July	36.55	1967 — 5 April (a)	36.55
1967 — 1 July	37.55	1 July (a)	37.55
1968 — 25 October	38.90	1968 — 25 October (a)	38.90
1969 — 19 December	42.40	1969 — 19 December (a)	42.40
1971 — 1 January	46.40	1970 — 26 October	49.00
1972 — 19 May	51.10	1971 — 26 October	51.50
1973 — 29 May	60.10	1972 — 26 June	53.50
1974 — 23 May	68.10	1973 — 8 June	57.00
1975 — 1 January	76.10	17 September	61.50
15 May	80.10	1974 — 31 May	69.00
Adult females (b) —		1975 — 1 May (a)	82.50
1974 — 23 May	57.90	1976 — 15 May (a)	94.20
30 September (c)	61.30	15 August (a) (e)	97.40
1975 — 1 January	68.50	15 November (a) (e)	99.80
15 May	72.10	1977 — 15 February (a) (e)	106.40
30 June (d)	80.10	15 May (a) (e)	108.80
Adult males and females (a) —		15 August (a) (e)	111.40
1975 — 18 September	82.90	29 December (a)	114.10
1976 — 15 February	88.20	1978 — 28 February	116.90
1 April	93.20	7 June	118.30
15 May	96.00	12 December	123.00
15 August	98.50	1979 — 27 June	126.90
22 November	100.70	1980 — 4 January	132.60
1977 — 31 March		14 July	138.20
24 May	106.40	1981 — 9 January	143.30
22 August	110.60	7 May	148.50
12 December	112.30	16 November (f)	151.20
1978 — 28 February		Adult females —	
7 June	114.00	1974 — 31 May	57.90
12 December	120.10	1975 — 1 May (a)	72.10
1979 — 27 June	123.90	30 June (a)	80.10
1980 — 4 January	129.50	1976 — 15 May (a)	91.50
14 July	134.90	15 August (a) (e)	94.60
1981 — 9 January	139.90	15 November (a) (e)	97.00
7 May	144.90	1977 — 15 February (a) (e)	103.60
		15 May (a) (e)	106.00
		15 August (a) (e)	108.60
		29 December (a)	111.20
		1978 — 28 February	114.00
		7 June	115.50
		12 December	120.10
		1979 — 27 June	123.90
		1980 — 4 January	129.50
		14 July	134.90
		1981 — 9 January	139.90
		7 May	144.90
		16 November (f)	151.20

(a) Rates operative from beginning of first pay-period commencing on or after the date shown. (b) Rates operative from beginning of first pay-period commencing on or after the date shown, except as indicated in footnotes (c) and (d). (c) Rate payable from beginning of pay-period in which 30 September 1974 occurred. (d) Rate payable from beginning of pay-period in which 30 June 1975 occurred. (e) Subject to application to The Western Australian Industrial Commission to amend an award or agreement. (f) Minimum wage prescribed for awards specified in the schedule attached to the order.

The statistics shown in the following table, which refers to Western Australian experience, relate generally to wages and hours prescribed in awards or determinations of the Federal and State industrial authorities or in agreements registered with them.

The minimum wage rates and index numbers shown in the table embrace a representative range of occupations and are based on the occupation and industry structures in Australia in 1954. The weekly wage rates given in the table, and used in the compilation of the indexes, represent the lowest rates payable for a full week's work (excluding overtime), as prescribed in representative industrial awards, determinations and agreements. The hourly wage rates are

obtained by relating the weekly wage rates and the weekly hours of work prescribed in awards, etc. The rural industries are excluded from the table because of coverage difficulties.

Because the indexes are designed to measure movements in prescribed minimum rates of 'wages' as distinct from 'salaries', those awards, determinations and agreements which relate solely or mainly to salary-earners are excluded.

WEIGHTED AVERAGE MINIMUM WEEKLY AND HOURLY WAGE RATES

Date	Weekly wage rates		Hourly wage rates		Index numbers (a)			
	Adult males	Adult females (b)	Adult males (c)	Adult females (b)	Weekly wage rates		Hourly wage rates	
					Males	Females (b)	Males (c)	Females (b)
End of June —	\$	\$	cents	cents				
1976	125.89	115.34	313.73	289.92	445.7	579.4	443.4	577.9
1977	141.99	131.85	354.19	331.42	502.8	662.3	500.6	660.6
1978	152.65	141.06	381.09	354.57	540.5	708.6	538.6	706.7
1979	163.71	151.59	408.73	381.04	579.7	761.5	577.7	759.5
1980 r	175.35	160.32	437.83	402.99	620.9	805.3	618.8	803.2
1981	196.60	185.28	491.22	465.72	696.1	930.7	694.3	928.3

(a) Base of series: weighted average weekly wage rate — Australia, 1954 = 100. (b) Excludes mining and quarrying and building and construction. (c) Excludes shipping and stevedoring.

The wage rates shown should not be regarded as actual current averages, but as indexes expressed in money terms, indicative of trends.

A more detailed description of the minimum wage rates index and more extensive tables are published by the Australian Statistician, Canberra in the monthly bulletin *Wage Rates* (Catalogue No. 6312.0).

Wage Indexation

In its National Wage decision of 30 April 1975, the Australian Conciliation and Arbitration Commission approved wage indexation, i.e. the adjustment of award wage and salary rates in accordance with changes in the Consumer Price Index, in principle, but only if applied in conjunction with 'appropriate wage fixing principles and the necessary "supporting mechanisms" to ensure their viability'. The Western Australian Industrial Commission, in its decision of 1 July 1975, adopted full wage indexation for a trial period. However, the Commission, in its decision of 20 August 1976, stated that 'the economic opinions put before us . . . lead us to conclude that the automatic quarterly adjustment of all wages and salaries in accordance with movements in the Consumer Price Index is not sustainable indefinitely as a feature of our wage fixing system without generating inflation, or unemployment, or both'. In that and subsequent decisions the Commission granted an increase which amounted to less than full indexation.

In a decision of 27 June 1979, the Australian Conciliation and Arbitration Commission stated its belief that the system of wage fixation based on indexation was not working and in the National Wage decision the Full Bench called a conference of all parties and interveners to consider whether indexation had a future. The final conference was held on 18 September 1979 and subsequently it was reported that while there was generally a desire for the continuance of a centralised system of wage fixation, significant differences existed as to the basis on which such a system should operate. The Full Bench determined that further debate on the future of the centralised system would be most appropriately dealt with in the context of the following six-monthly review. In the meantime the existing principles would be applied.

In the National Wage Case decision handed down on 31 July 1981 the Australian Conciliation and Arbitration Commission stated that 'events since April have shown clearly that the commitment of the participants to the system is not strong enough to sustain the requirements for its continued operation,' and decided to abandon the system.

On 30 October 1981 the Western Australian Industrial Commission accepted and applied the opinion of the Australian Conciliation and Arbitration Commission and refused to adjust all wage rates by movement in the Consumer Price Index.

In the National Wage Case decision handed down on 14 May 1982 the Australian Conciliation and Arbitration Commission adjourned the proceedings to a date to be fixed to review the future of wage fixing procedures.

A summary of the wage indexation system as it operated between April 1975 and July 1981 is contained in the 1982 issue of the Western Australian Year Book.

Average Weekly Earnings

For many years estimates of average weekly earnings of civilian wage and salary earners in industries other than agriculture and private domestic service were obtained from State pay-roll tax records, direct returns from government and other bodies, and from estimates of the number of employees and wages and salaries not covered by those sources. This series ceased after compiling figures for September quarter 1981 because deficiencies in the data were revealed following a major review of data coverage and the quality of the information compiled.

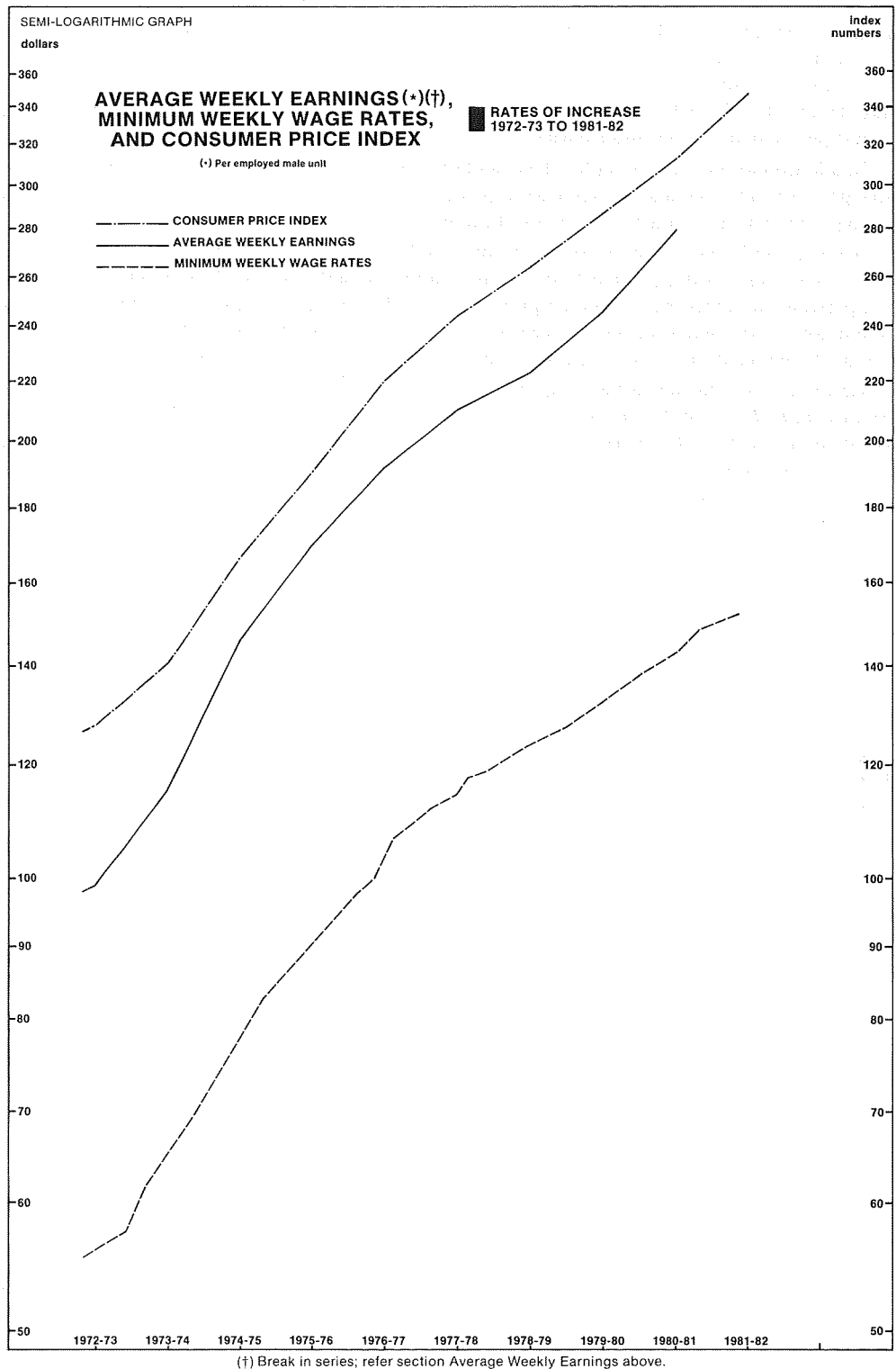
A new quarterly survey, designed to obtain employment and earnings information direct from a sample of private and government employers was introduced in the September quarter 1981. One of the primary aims of the new statistical series is to measure the trend of average earnings. Further information concerning these matters is contained in the following information papers, issued by the Australian Statistician, Canberra: *Review of ABS Employment Statistics, July 1981* (Catalogue No. 6239.0) and *Average Weekly Earnings: New Series to Replace Former Payroll Tax Based Series, March 1982* (Catalogue No. 6336.0).

In the next table weekly total earnings refers to earnings of employees in the reference period, before taxation and any other deductions, e.g. superannuation, board and lodging, etc. have been made. Earnings comprise overtime earnings, ordinary time earnings, shift allowances, penalty rates, commission and similar payments, and that part of paid annual leave, paid sick leave, long service leave and paid holidays taken during the reference period. Retrospective pay or pay in advance, annual leave loadings and other bonuses not related to the reference period are excluded. Weekly ordinary time earnings refers to that part of weekly total earnings attributable to award, standard or agreed hours of work. Included in relation to these hours are shift allowances, penalty rates, commissions, bonuses and incentive payments, and one week's proportion of payments for annual and other leave taken during the specified pay-period.

AVERAGE WEEKLY EARNINGS OF EMPLOYEES — AUSTRALIA
(dollars)

Quarter	Survey reference date	Males			Females			Persons		
		Full-time adults		All males	Full-time adults		All females	Full-time adults		All employees
		Weekly ordinary time earnings	Weekly total earnings	Weekly total earnings	Weekly ordinary time earnings	Weekly total earnings	Weekly total earnings	Weekly ordinary time earnings	Weekly total earnings	Weekly total earnings
1981 —										
September	14 August	287.20	311.20	286.60	234.80	240.90	194.70	271.40	289.90	252.20
December	23 October	300.00	327.50	299.40	243.40	250.30	197.30	283.20	304.40	260.80
1982 —										
March	19 February	314.10	341.30	316.00	250.50	257.70	207.10	294.30	315.70	274.60
June	21 May	324.40	352.10	326.00	261.50	268.20	215.50	305.10	326.30	283.90

Quarterly figures corresponding to those shown in the above table are published by the Australian Statistician in the bulletins *Average Weekly Earnings* (Catalogue No. 6302.0) and the *Monthly Summary of Statistics, Australia* (Catalogue No. 1304.0).



SURVEYS OF EARNINGS AND HOURS

Statistics of earnings and hours are collected by means of a stratified random sample of most private employers subject to pay-roll tax and, either complete enumeration or stratified random sample of Commonwealth, State and local government employers. At the time of the selection of the sample for the 1980 Survey pay-roll tax was payable by employers paying more than \$72,000 per year in wages and salaries.

In addition to obtaining data for the calculation of average weekly earnings, average weekly hours paid for, and average hourly earnings, the surveys obtain information on overtime and ordinary-time earnings and hours for full-time employees (other than managerial, etc. staff).

All wage and salary earners are represented in the survey except members of defence forces, employees in agriculture, private households employing staff, waterside workers on a casual basis, persons employed by private employers (other than hospitals) not subject to pay-roll tax, and employees on workers' compensation. Excluded from the surveys are employees of religious, benevolent and other similar organisations exempt from pay-roll tax.

Definitions of the terms used in the following tables may be found in the publication *Earnings and Hours of Employees, October 1980* (Catalogue No. 6304.0), published by the Australian Statistician, Canberra. The following tables refer to survey results for Western Australia. It should be noted that changes in pay-roll tax exemption levels may affect the comparability of survey results for different years.

AVERAGE EARNINGS AND HOURS — FULL-TIME NON-MANAGERIAL EMPLOYEES
ALL INDUSTRY GROUPS (a)

Particulars	October —					
	1975	1976	1977	1978	1979	1980
PRIVATE EMPLOYEES						
Average weekly earnings —	\$	\$	\$	\$	\$	\$
Adult males	169.90	190.70	215.40	226.50	251.40	282.90
Junior males	81.50	96.10	107.00	112.80	127.50	140.50
Adult females	121.50	139.40	151.70	159.50	175.30	193.80
Junior females	78.50	93.60	99.70	104.40	114.20	125.60
Average weekly hours paid for —	hrs	hrs	hrs	hrs	hrs	hrs
Adult males	42.3	42.4	42.5	42.0	42.3	42.5
Junior males	40.4	40.3	40.7	40.3	40.9	41.6
Adult females	39.0	39.0	39.1	38.9	39.4	38.8
Junior females	39.1	39.3	39.1	39.2	39.4	39.6
Average hourly earnings —	\$	\$	\$	\$	\$	\$
Adult males	4.02	4.50	5.07	5.39	5.95	6.66
Junior males	2.02	2.38	2.63	2.79	3.12	3.38
Adult females	3.12	3.57	3.88	4.10	4.44	5.00
Junior females	2.01	2.38	2.55	2.66	2.90	3.17
TOTAL (PRIVATE AND GOVERNMENT) EMPLOYEES						
Average weekly earnings —	\$	\$	\$	\$	\$	\$
Adult males	168.60	190.40	214.20	223.30	242.40	280.50
Junior males	84.40	98.40	110.00	116.20	128.10	144.10
Adult females	130.90	149.50	166.50	174.20	193.70	216.50
Junior females	79.90	94.50	104.40	109.00	119.00	132.60
Average weekly hours paid for —	hrs	hrs	hrs	hrs	hrs	hrs
Adult males	41.4	41.4	41.6	40.9	41.1	41.5
Junior males	39.9	39.9	40.1	39.8	40.3	41.0
Adult females	38.7	38.8	38.6	38.5	38.8	38.5
Junior females	39.0	39.1	38.9	38.9	39.1	39.3
Average hourly earnings —	\$	\$	\$	\$	\$	\$
Adult males	4.07	4.60	5.15	5.46	5.89	6.76
Junior males	2.12	2.47	2.74	2.92	3.18	3.52
Adult females	3.38	3.85	4.31	4.53	4.99	5.62
Junior females	2.05	2.42	2.68	2.80	3.04	3.37

(a) See text below for employees excluded.

**AVERAGE WEEKLY OVERTIME AND ORDINARY-TIME EARNINGS
FULL-TIME NON-MANAGERIAL EMPLOYEES (a): OCTOBER 1980
(\$)**

Particulars	Average weekly overtime earnings	Average weekly ordinary-time earnings	Average weekly total earnings
PRIVATE EMPLOYEES			
Adult males —			
Manufacturing —			
Metal products, machinery and equipment	40.70	232.60	273.30
Other	34.80	225.80	260.60
Total, Manufacturing	37.30	228.70	265.90
Non-manufacturing	43.70	249.30	293.00
All industry groups	41.30	241.60	282.90
Junior males — all industry groups	10.50	130.00	140.50
Females — all industry groups —			
Adult	5.50	188.30	193.80
Junior	2.40	123.20	125.60
TOTAL (PRIVATE AND GOVERNMENT) EMPLOYEES			
Adult males —			
Manufacturing —			
Metal products, machinery and equipment	37.70	229.70	267.40
Other	34.60	225.70	260.30
Total, Manufacturing	36.00	227.60	263.60
Non-manufacturing	30.40	255.80	286.20
All industry groups	31.80	248.80	280.50
Junior males — all industry groups	9.30	134.80	144.10
Females — all industry groups —			
Adult	4.20	212.30	216.50
Junior	2.00	130.60	132.60

(a) Averages for all employees represented in the surveys. See text below for employees excluded.

All wage and salary earners are represented in the survey except members of defence forces, employees in agriculture, private households employing staff, waterside workers on a casual basis, persons employed by private employers (other than hospitals) not subject to pay-roll tax, and employees on workers' compensation. Excluded from the surveys are employees of religious, benevolent and other similar organisations exempt from pay-roll tax.

HOURS OF WORK AND LEAVE PROVISIONS

Standard Hours of Work. In the fixation of weekly wage rates most industrial tribunals prescribe the number of hours constituting a full week's work for the wages specified.

The forty-hour week has operated in Australia generally from 1 January 1948 (in New South Wales from 1 July 1947). However, the number of hours constituting a full week's work (excluding overtime) differs between occupations and/or between States. The weighted average standard hours of work (excluding overtime) prescribed in awards, determinations and agreements for a full working week, in respect of adult male workers in all industry groups except rural, and shipping and stevedoring, at 31 December 1981 are shown in the following table.

STANDARD HOURS OF WORK AT 31 DECEMBER 1981

Area	Weighted average standard hours	
	Adult males	Adult females
New South Wales	39.68	39.53
Victoria	39.89	39.81
Queensland	39.81	39.70
South Australia	39.90	39.77
Western Australia	39.75	39.78
Tasmania	39.87	39.63
Australia	39.79	39.67

Following a general inquiry concerning annual leave and public holidays, the Western Australian Court of Arbitration in June 1963 adopted three weeks as the standard for the normal period of annual leave in State awards, with four weeks for seven-day shift workers. Existing awards and agreements which already provided annual leave in excess of this standard were to be examined separately to ascertain whether special circumstances existed to justify leave greater than the normal standard.

In the inquiry the State Government sought a reduction in the number of public holidays and a review of other conditions where these were more favourable than the Court's standard. Private employers opposed any increase in annual leave but, alternatively, submitted that, if there was to be an increase, then the new standard should be two weeks and four days per annum or the number of public holidays in each year should be reduced by one. Both these submissions were rejected and the standard number of public holidays was retained at ten with the provision that, where an award provided for more than ten public holidays a year, that award, unless the union consented to a reduction to ten, would be excluded from the order amending the annual leave provisions until it was established that special circumstances justified the continuance of the greater number of holidays.

In November, 1963 the Court refused an application by employers for the right to split the annual leave into two parts, since it decided to follow the decision of most other State tribunals and allow the additional leave in conformity with conditions similar to those prescribed by the Australian Conciliation and Arbitration Commission. The right to split the leave would be allowed by the Court only in exceptional circumstances, unless all the parties concerned agreed to the inclusion of such a provision.

As from 1 January 1973, employees of the Commonwealth Government and the State Government were granted four weeks' paid annual leave, together with an annual leave loading of 17.5 per cent of their weekly salary, up to a specified maximum amount. Subsequently, these entitlements were extended to most awards and agreements so that most employees now receive at least four weeks' paid annual leave and an annual leave loading payment.

Long Service Leave. The *Long Service Leave Act 1958-1973* (State) confers entitlement to long service leave with pay on employees for whom such leave is not otherwise provided. Entitlement accrues only in relation to continuous service with one employer, but continuity of service is not affected by the transfer of a business from one employer to another. Leave of thirteen weeks on ordinary pay is granted in respect of the first fifteen years of service. For each subsequent ten years the entitlement is eight and two-thirds weeks, with *pro rata* conditions applying in the case of termination of employment for any reason other than serious misconduct. An employee who has completed at least ten years' service but less than fifteen years is entitled to *pro rata* leave, on the basis of thirteen weeks for fifteen years, if his employment is terminated by the employer for any reason other than serious misconduct; or by the employee on account of sickness, injury, or domestic or other pressing necessity. An employee forfeits his right to long service leave if he engages in alternative employment for reward during the period of leave. In the case of termination by death of an employee payment in lieu of leave may be made to his personal representative.

The *Long Service Leave Act Amendment Act 1973* which came into operation on 1 March 1974, provides that the 'standard' period of thirteen weeks' leave after fifteen years' service may be varied as the result of an agreement between The Confederation of Western Australian Industry (Incorporated) and the Trades and Labor Council of Western Australia or by a determination of The Western Australian Industrial Commission in Court Session.

WORKERS' COMPENSATION

Compensation for workers in Western Australia who suffer injuries in the course of employment was originally provided in 1912 under the provisions of the *Workers' Compensation Act*

1912-1979 (State). This Act was repealed on 3 May 1982 and replaced by the *Workers' Compensation and Assistance Act 1981* (State). Details of the earlier Act are contained in the 1982 and earlier editions of the *Western Australian Year Book*.

The *Workers' Compensation and Assistance Act 1981* provides compensation for personal injury arising out of or in the course of employment, for death resulting from such injury, and for disease or the occurrence of a pre-existing disease where employment was a contributing factor. The provisions of the Act do not extend to employees of the Commonwealth Government for whom compensation is provided by the *Compensation (Commonwealth Government Employees) Act 1971*.

Every employer, other than a self insurer, is required to effect insurance with an approved insurer for the full amount of his liability to pay compensation under the Act to all workers in his employment.

The new Act continues the existence of the Workers' Compensation Board but restricts the Board to judicial functions. The Board consists of three members including a Chairman, appointed by the Governor on the recommendation of the Minister. The Chairman, who has the status of a Judge, must be a legal practitioner of not less than eight years practice and standing. Of the two remaining members one must be a person experienced in management affairs in commerce or industry or both and the other must be a person experienced in trade union affairs. The Minister may request the Confederation of Western Australian Industry (Incorporated) and the Trades and Labor Council of Western Australia to submit the names of persons, each of whom is qualified and willing to act as a nominee member of the Board prior to making a recommendation to the Governor.

The Board has exclusive jurisdiction to examine, hear and determine all matters and questions arising out of claims for compensation under the Act and all questions as to the right or amount of indemnity. The Board's determinations are final and conclusive except that a party to any proceedings before the Board who is dissatisfied with a determination may appeal to the Full Court of the Supreme Court. Additionally, when a question of law arises in any proceedings before the Board, the Board may refer the question for the decision of the Full Court of the Supreme Court. The Act also provides that a Supplementary Workers' Compensation Board may be appointed by the Governor if he is satisfied that the Board is unable to deal expeditiously with all its business.

The Workers' Assistance Commission is established by the new Act and is responsible for a range of administrative functions, including those formerly carried out by the Board. The Commission consists of seven members including a Chairman. The Chairman is a nominee member appointed by the Governor on the recommendation of the Minister and must be a public servant who, in the opinion of the Minister, has had administrative experience at a senior level. The Manager of the Commission serves as a Commission member and five other nominee members are appointed by the Governor on the recommendation of the Minister. Of these five nominee members one must be experienced in management affairs, in commerce or industry or both; one must be experienced in trade union affairs; one must be experienced in insurance business but not employed by the State Government Insurance Office; one must be employed in the State Government Insurance Office and one must be a medical practitioner employed in the Public Health Department. Before recommending appointments to the Commission the Minister may request the Confederation of Western Australian Industry (Incorporated); the Trades and Labor Council of Western Australia; the Western Australian Regional Advisory Board of the Insurance Council of Australia Limited; the Permanent Head of the State Government Insurance Office and the Permanent Head of the Public Health Department to submit the names of persons qualified and willing to act as Commission members.

The functions of the Commission include: participation in research into the causes, incidence and methods of prevention of accidents, injuries and diseases in respect of which

compensation may be payable; encouragement of the prevention or minimisation of accidents, injuries and diseases; co-ordination of rehabilitative, occupational or vocational training or remedial treatment for workers suffering injuries or disease; formulating recommendations and preparing estimates for submission to Parliament of the cost of providing facilities for rehabilitation and re-employment of workers sustaining permanent or temporary disablement from a compensable disability; and obtaining from all insurers and self-insurers such information and returns as it considers desirable for the better administration of the Act.

An important aspect of the new Act is emphasis on rehabilitation. Insurers and self-insurers are required to supply the Commission with prescribed particulars with respect to any worker whose period of incapacity exceeds twelve weeks. The Commission may make further enquiries regarding the workers' disability and may require the worker to attend a medical specialist or other professional person or groups for assessment of the means and prospects of rehabilitation. The Commission may require the worker to undertake treatment by way of rehabilitation or a programme of occupational or vocational training. It may co-ordinate such a programme and authorise, in respect of the worker, expenditure not exceeding \$2,000 on occupational and vocational training (or expenditure in excess of \$2,000 in any case it considers appropriate to do so). The Commission may make arrangements with other persons or authorities for the co-ordination and use of facilities for training or treatment of workers.

The amounts of payments, allowances and benefits under the Act are calculated by reference to a 'prescribed amount' which is varied annually on 1 July according to a formula which takes into account variations in the weighted average minimum award rate for adult males under Western Australian State Awards. As at 3 May 1982, the prescribed amount was \$58,885.

Where total incapacity for work results from the disability, the weekly payment during the incapacity is equal to the weekly earnings which the worker would have received had he not been incapacitated. Where the work normally performed is subject to an industrial award or agreement, weekly earnings are taken as the total wages, salary or other remuneration (excluding overtime, bonuses and allowances but including over award payments) payable at the time of the incapacity for a week's work under that award. Where the work is not subject to an industrial award, or where it is subject to a system of payment by results, weekly earnings are determined by reference to an award or agreement which can be fairly applied to that type of work. In the case of partial incapacity, the weekly payment is the amount by which the weekly earnings so computed exceed the amount the worker is earning, or able to earn in some suitable employment, after the occurrence of the disability.

The total liability of the employer in respect of weekly payments is limited to \$58,885 except where the Board considers that a disability to a worker has resulted in his permanent total incapacity for work. In such a case, the Board may order weekly payments to the worker to continue at the appropriate rate for the period of expectation of his life or up to retirement age.

Additional amounts are payable up to a maximum of 10 per cent of the prescribed amount, i.e. \$5,885.50 (or more, if the Board finds that in particular circumstances this sum is inadequate) for expenses incurred in respect of first aid and ambulance services, medicines, medical or surgical attendance, hospital treatment and the like. In the event of the death of the worker funeral expenses are compensable up to a prescribed maximum amount.

The Act provides for compensation in the form of a lump sum payment up to a maximum of \$58,885 in respect of specified injuries resulting in such disabilities as loss of sight, hearing or mental powers or loss of a limb or limbs. Where lump sum payments are made, all entitlement to weekly payment ceases.

Where death results from the disability and the worker leaves any adult dependants who are wholly dependent on the worker's earnings, a sum equal to 85 per cent of his residual entitlement is payable. However, payments to a wholly dependent mother or spouse are subject

to a guaranteed minimum sum. A child's allowance is payable weekly up to the age of sixteen years (or twenty-one years in the case of a full time student) in respect of any wholly dependent child.

Provisions also exists for partial dependants to receive compensation in proportion to the loss of necessary financial support suffered by such dependants.

INDUSTRIAL ACCIDENTS

Statistics of industrial accidents in Western Australia are compiled on two bases, namely (i) those which resulted in absence from work for one day or more, and (ii) those which resulted in absence from work for one week or more.

The statistics contained in the following tables are derived from details of claims for workers' compensation paid by insurers and self-insurers. They relate to claims *reported to have been closed* during the year ended 30 June 1981. Figures for 1980-81 are comparable with those for 1979-80, but are not comparable with those for earlier years. For detailed explanation see the publications *Industrial Accidents* (Catalogue Nos. 6301.5 and 6302.5).

The figures do not represent all industrial accidents which actually occurred during the year because: (i) they refer to claims closed; (ii) in the case of non-fatal accidents, they include only those which resulted in absence from work for one day or more (or one week or more); (iii) only accidents coming within the scope of the *Workers' Compensation Act 1912-1981* are included in the statistics, which therefore exclude industrial accidents resulting in the death of, or injury to, self-employed persons and persons employed by the Commonwealth Government. (Compensation for Commonwealth Government employees is provided by the *Compensation (Commonwealth Government Employees) Act 1971.*); and (iv) the statistics include only accidents occurring at work site or in the course of the worker's normal duties and do not therefore include 'journey' cases, i.e. death of, or injury to, an employee while travelling between his place of residence and the place of employment. During the year ended 30 June 1981, 1,065 claims were reported closed in respect of 'journey' cases resulting in absence from work for one day or more, the total time lost being 6,671 weeks and the cost of claims, \$1,551,566. In respect of 'journey' cases resulting in absence from work for one week or more, 676 cases were reported closed. The total time lost was 6,496 weeks and the cost of claims was \$1,493,881.

The statistics relate only to accidents, and particulars of cases of industrial disease are therefore excluded. The tables also exclude details of fatal accidents.

For the purpose of these statistics, each claim is treated as a separate industrial accident and data are prepared from details of claims reported closed during the year under review (in this instance, the year ended 30 June 1981). In respect of reopened claims, the additional time lost and additional costs are included where appropriate in the tables below titled 'Non-Fatal Industrial Accidents 1980-81' and 'Non-Fatal Accidents — Industry Groups 1980-81' but excluded from the table titled 'Non-Fatal Accidents — Duration of Time Lost 1980-81'. To avoid duplication the number of such cases has been excluded from all tables.

The following definitions should be borne in mind when considering the data shown in the tables. *Cost of claims* means the *total* amount of payments made (principally in the form of compensation for loss of wages, and for medical and hospital expenses, and lump sum settlements) in respect of claims reported closed during the year. The figures do not therefore necessarily represent amounts actually paid in the year under review. *Time lost* means the *total* time lost (i.e. from date of injury) in respect of claims reported closed during the year. The term is therefore not necessarily restricted to time lost during the year under review, since the accident may have occurred in an earlier year.

Statistics in greater detail, as well as analyses according to additional characteristics, are available in the publication, *Industrial Accidents (Series A)* (Catalogue No. 6301.5), which relates to accidents resulting in death or absence from work for one day or more. This publication is issued annually by the Western Australian Office of the Australian Bureau of Statistics.

Details of the number of non-fatal industrial accidents, cost of claims and time lost are shown in the next table for the year 1980-81.

NON-FATAL INDUSTRIAL ACCIDENTS: 1980-81

Particulars		Accidents resulting in absence from work for —					
		One day or more			One week or more		
		Males	Females	Persons	Males	Females	Persons
Non-fatal accidents —							
Number		27,921	3,700	31,621	15,143	2,128	17,271
Cost of claims (a) —							
Total	\$'000	27,572	4,054	31,626	25,468	3,824	29,293
Average per accident	\$	987	1,096	1,000	1,682	1,797	1,696
Time lost (a) —							
Total	weeks	90,050	15,292	105,342	83,935	14,523	98,458
Average per accident	weeks	3.2	4.1	3.3	5.5	6.8	5.7

(a) See definitions above.

The following table give details of non-fatal industrial accidents for 1980-81 according to broad industry groups.

NON-FATAL INDUSTRIAL ACCIDENTS — INDUSTRY GROUPS: 1980-81

Industry group	Non-fatal accidents			
	Number	Per cent of total	Cost of claims (a) (\$'000)	Time lost (a) (weeks)
TIME LOST — ONE DAY OR MORE				
Agriculture, forestry, fishing and hunting	1,277	4.0	1,568	5,039
Mining	2,988	9.4	3,257	10,574
Manufacturing	10,423	33.0	9,885	31,041
Electricity, gas and water	707	2.2	877	3,474
Construction	4,213	13.3	4,083	14,226
Wholesale and retail trade	3,758	11.9	3,033	10,411
Transport and storage	2,185	6.9	2,669	8,815
Finance, insurance, real estate and business services	573	1.8	642	1,891
Community services	2,962	9.4	3,305	11,391
Entertainment, recreation, restaurants, hotels, etc.	996	3.1	1,132	4,133
Other industries	1,539	4.9	1,175	4,347
Total	31,621	100.0	31,626	105,342
TIME LOST — ONE WEEK OR MORE				
Agriculture, forestry, fishing and hunting	930	5.4	1,507	4,860
Mining	1,673	9.7	3,015	9,956
Manufacturing	5,265	30.5	9,086	28,593
Electricity, gas and water	416	2.4	827	3,341
Construction	2,310	13.4	3,763	13,329
Wholesale and retail trade	1,920	11.1	2,732	9,504
Transport and storage	1,349	7.8	2,525	8,403
Finance, insurance, real estate and business services	297	1.7	599	1,762
Community services	1,666	9.6	3,099	10,767
Entertainment, recreation, restaurants, hotels, etc.	629	3.6	1,075	3,944
Other industries	816	4.7	1,063	4,000
Total	17,271	100.0	29,293	98,458

(a) For definitions see text.

The final table in this Part shows the duration of time lost from work by males and females for non-fatal accidents.

NON-FATAL ACCIDENTS — DURATION OF TIME LOST (a): 1980-81

Duration of time lost	Males		Females		Persons		
	Number	Time lost (weeks)	Number	Time lost (weeks)	Time lost		
					Number	Weeks	Per cent of total
1 day but under 1 week	12,778	6,114	1,572	769	14,350	6,884	7.0
1 week but under 2 weeks	7,035	9,067	965	1,228	8,000	10,295	10.4
2 weeks but under 4 weeks	3,923	10,467	543	1,416	4,466	11,883	12.0
4 weeks but under 6 weeks	1,466	6,962	177	842	1,643	7,804	7.9
6 weeks but under 8 weeks	821	5,530	103	699	924	6,229	6.3
8 weeks but under 13 weeks	844	8,271	133	1,334	977	9,605	9.7
13 weeks but under 26 weeks	604	10,611	91	1,586	695	12,197	12.3
26 weeks but under 52 weeks	257	9,290	70	2,519	327	11,809	12.0
52 weeks but under 104 weeks	145	10,329	33	2,414	178	12,743	12.9
104 weeks but under 156 weeks	31	3,934	9	1,155	40	5,089	5.2
156 weeks and more	17	3,576	4	687	21	4,263	4.3
Total	27,921	84,152	3,700	14,649	31,621	98,801	100.0

(a) For definitions see text.

Chapter X — continued

Part 2 — Employment

In addition to the employment data appearing in this Part, references to the numbers of persons engaged in particular activities are to be found elsewhere in the Year Book. In Chapter V, for example, Part 1 shows numbers engaged in teaching and Part 3 contains details of hospital staffs. Employment in building appears in Chapter VII, Part 3. In Chapter VIII, Part 2 provides information on employment at mines, and Part 3 includes tables relating wholly, or in part, to employment in factories. Chapter IX, Part 2 gives numbers employed in retail and selected service establishments, and Part 3 shows numbers engaged in various types of transport undertakings.

THE LABOUR FORCE

The labour force comprises two categories of persons: those who are employed and those who are unemployed. In the first category are included employers, self-employed persons, wage and salary earners, and unpaid family helpers. Comprehensive details for each State and Territory and for Australia as a whole in respect of persons in the labour force, classified according to industry, occupation and occupational status (i.e. whether employers, self-employed persons, wage and salary earners or unpaid family helpers) and personal characteristics such as age, sex, marital status and birthplace, are obtained only at a general census of population.

In addition to the population censuses, estimates of the labour force are obtained through the population survey, which is now conducted monthly by means of personal interviews at a sample of households throughout Australia. The survey provides particulars of the demographic and labour force characteristics of the population.

Detailed industry estimates for each State and Territory are obtained only in respect of employees, through a monthly collection from employers. These estimates, which exclude employees in agriculture and in private households employing staff, are based on benchmarks established by analysing data from the population census and other relevant sources such as special returns from government bodies and the economic censuses and surveys of the Australian Bureau of Statistics.

The Population Census

The comprehensive tables resulting from the 1981 Census include detailed analyses of the labour force according to such characteristics as age, marital status, birthplace, occupational status, industry and occupation. Only some of these tables, in condensed form, have been included in this Chapter. The reader requiring additional information is referred to the census bulletins published by the Australian Statistician, Canberra.

Population classified according to Occupational Status

OCCUPATIONAL STATUS — CENSUS, 30 JUNE 1981

Occupational status	Males '000	Females '000	Persons '000	Proportion of total population		
				Males Per cent	Females Per cent	Persons Per cent
In labour force —						
Employed —						
Employer	25.6	11.3	36.9	2.0	0.9	2.9
Self-employed	38.8	17.5	56.4	3.1	1.4	4.4
Employee on wage or salary	284.9	169.8	454.7	22.4	13.3	35.7
Helper, unpaid	1.1	4.8	5.9	0.1	0.4	0.5
Total, Employed	350.5	203.4	553.9	27.5	16.0	43.5
Unemployed	21.5	15.5	37.1	1.7	1.2	2.9
Total, In labour force	372.0	218.9	591.0	29.2	17.2	46.4
Not in labour force (15 years of age or more)	99.9	249.7	349.6	7.8	19.6	27.4
Under 15 years of age	171.1	161.9	333.1	13.4	12.7	26.2
TOTAL POPULATION	643.1	630.5	1,273.6	50.5	49.5	100.0

LABOUR FORCE — OCCUPATIONAL STATUS, MARITAL STATUS AND SEX
CENSUS, 30 JUNE 1981
(Thousands)

Occupational status	Never married		Now married		Widowed		Other marital status (a)		Total	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Employer	2.3	0.3	21.8	10.4	0.2	0.2	1.4	0.4	25.6	11.3
Self-employed	6.0	0.7	30.3	15.8	0.3	0.4	2.2	0.6	38.8	17.5
Wage or salary earner	90.4	59.7	174.8	92.3	1.8	3.6	17.9	14.2	284.9	169.8
Helper, unpaid	0.6	0.4	0.5	4.1	—	0.1	0.1	0.1	1.1	4.8
Unemployed	12.5	8.7	6.8	4.7	0.2	0.5	2.1	1.7	21.5	15.5
Not in labour force	35.4	36.0	51.0	156.0	7.5	40.6	5.9	17.1	99.9	249.7
Total, 15 years and over	147.1	105.9	285.2	283.2	10.1	45.5	29.5	34.0	472.0	468.6

(a) Comprises the categories *Permanently separated* and *Divorced*.

LABOUR FORCE — EMPLOYMENT STATUS, AGE AND SEX
CENSUS, 30 JUNE 1981
(Thousands)

Age (years)	Employed		Unemployed		Not in labour force		Total	
	Males	Females	Males	Females	Males	Females	Males	Females
15-19	31.6	26.6	4.7	5.0	21.0	23.3	57.3	54.9
20-24	46.3	34.2	5.2	3.9	5.6	17.3	57.0	55.4
25-29	49.4	27.1	3.2	1.8	3.3	26.1	55.9	55.1
30-34	51.5	26.4	2.1	1.3	2.6	25.8	56.2	53.5
35-39	41.5	23.5	1.5	0.9	2.0	17.2	45.0	41.6
40-44	34.9	21.2	1.2	0.7	2.1	13.5	38.2	35.5
45-49	29.2	16.7	1.0	0.6	2.2	12.7	32.4	30.1
50-54	27.7	13.4	1.0	0.4	3.2	15.8	31.9	29.7
55-59	22.7	8.5	0.9	0.3	4.7	18.4	28.3	27.1
60-64	10.6	3.3	0.4	0.1	10.2	19.3	21.2	22.8
65 and over	5.1	2.4	0.3	0.4	43.1	60.1	48.5	62.9
Total	350.5	203.4	21.5	15.5	99.9	249.7	472.0	468.6

Classification according to Industry

For census purposes, industry may be defined as the *branch of productive activity, business or service carried out by the establishment in which a person is employed*. It is concerned with the activity of persons, firms or businesses considered as a group producing the same commodity, performing the same process or providing the same service. All persons engaged in any such branch of economic activity are classified industrially as belonging to that particular branch irrespective of their personal occupation within the industry. Examples are: *Mining*, which includes, in addition to miners and prospectors, such persons as laboratory technicians, transport workers and office staff employed by mining companies; *Water Transport*, which covers staff members of shipping companies and agencies, as well as ships' crews; and professional activities such as law and architecture which include not only qualified practitioners but also persons employed by them as, for example, receptionists, law clerks and draftsmen.

Classification according to industry at the 1981 Census has been made on the basis of the 1978 edition of the *Australian Standard Industrial Classification*, prepared by the Australian Statistician, Canberra. For the Population Census an 'undefined' category was added to certain Divisions of the classification to facilitate the coding of imprecise or generalised descriptions of industrial activities on the census schedules. The classification divides the labour force into thirteen Divisions which are in turn divided into Sub-divisions, Groups and Classes.

In the table below, the employed population is classified according to occupational status within each of the thirteen industry divisions.

EMPLOYED POPULATION — OCCUPATIONAL STATUS AND INDUSTRY CENSUS, 30 JUNE 1981 (Thousands)

Industry division	Occupational status				Total
	Employer	Self-employed	Employee on wage or salary	Helper, unpaid	
MALES					
Agriculture, forestry, fishing and hunting	5.8	13.1	12.1	0.4	31.5
Mining	0.1	0.3	18.8	—	19.2
Manufacturing	2.2	1.9	51.2	—	55.3
Electricity, gas and water	—	—	8.8	—	8.8
Construction	3.8	7.1	25.9	—	36.8
Wholesale and retail trade	6.6	5.9	43.3	0.1	55.9
Transport and storage	0.7	2.9	23.0	—	26.6
Communication	—	—	7.4	—	7.5
Finance, insurance, real estate and business services	2.7	3.3	20.3	—	26.2
Public administration and defence	—	—	17.2	—	17.2
Community services	1.5	0.5	31.6	—	33.6
Entertainment, recreation, restaurants, hotels and personal services	1.5	1.7	8.8	—	12.1
Inadequately described and not stated	0.7	2.2	16.5	0.4	19.8
Total males employed	25.6	38.8	284.9	1.1	350.5
FEMALES					
Agriculture, forestry, fishing and hunting	2.7	6.0	2.7	0.9	12.2
Mining	—	0.1	2.8	—	2.9
Manufacturing	0.8	0.7	12.4	0.1	13.9
Electricity, gas and water	—	—	0.8	—	0.8
Construction	1.0	1.3	2.5	0.1	4.9
Wholesale and retail trade	3.6	3.8	35.1	0.3	42.8
Transport and storage	0.3	0.7	3.3	—	4.3
Communication	—	—	2.4	—	2.4
Finance, insurance, real estate and business services	0.7	1.6	18.7	0.1	21.0
Public administration and defence	—	—	6.7	—	6.7
Community services	0.3	0.6	55.7	0.1	56.6
Entertainment, recreation, restaurants, hotels and personal services	1.3	1.1	15.0	0.1	17.5
Inadequately described and not stated	0.7	1.9	11.8	3.0	17.4
Total females employed	11.3	17.5	169.8	4.8	203.4

EMPLOYED POPULATION — INDUSTRY: CENSUS, 30 JUNE 1981

Industry division and sub-division (a)	Persons			
	Males '000	Females '000	Number '000	Per cent of total
Agriculture, forestry, fishing and hunting —				
Agriculture	27.2	11.4	38.6	7.0
Other and undefined	4.3	0.8	5.1	0.9
Total, Agriculture, forestry, fishing and hunting	31.5	12.2	43.7	7.9
Mining —				
Metallic minerals	13.2	1.6	14.8	2.7
Other and undefined	6.0	1.2	7.2	1.3
Total, Mining	19.2	2.8	22.0	4.0
Manufacturing —				
Food, beverages and tobacco	7.5	3.5	11.0	2.0
Wood, wood products and furniture (except sheet metal)	6.5	1.3	7.8	1.4
Paper and paper products, printing and publishing	4.5	2.1	6.6	1.2
Basic metal products	6.4	0.6	7.0	1.3
Fabricated metal products	8.3	1.2	9.5	1.7
Other industrial machinery and equipment and household appliances	7.0	1.2	8.2	1.5
Other and undefined	15.1	4.0	19.1	3.4
Total, Manufacturing	55.3	13.9	69.2	12.5
Electricity, gas and water	8.8	0.8	9.6	1.7
Construction —				
General construction	15.8	2.1	17.9	3.2
Special trade contracting	17.1	2.4	19.5	3.5
Total, Construction (b)	36.8	4.9	41.7	7.5
Wholesale and retail trade —				
Wholesale trade	22.7	8.4	31.1	5.6
Retail trade	33.1	34.3	67.4	12.2
Total, Wholesale and retail trade (b)	55.9	42.8	98.7	17.8
Transport and storage —				
Road transport	10.3	2.0	12.3	2.2
Railway transport	8.2	0.4	8.6	1.6
Other and undefined	8.1	1.9	10.0	1.8
Total, Transport and storage	26.6	4.3	30.9	5.6
Communication	7.5	2.4	9.9	1.8
Finance, insurance, real estate and business services —				
Finance and investment	6.5	7.0	13.5	2.4
Real estate and business services	17.0	11.4	28.4	5.1
Other and undefined	2.8	2.5	5.3	1.0
Total, Finance, insurance, real estate and business services	26.2	21.0	47.2	8.5
Public administration and defence —				
Public administration	13.7	6.3	20.0	3.6
Other and undefined	3.5	0.5	3.9	0.7
Total, Public administration and defence	17.2	6.7	23.9	4.3
Community services —				
Health	9.6	28.6	38.1	6.9
Education, libraries, museums and art galleries	13.9	22.1	36.0	6.5
Welfare and religious institutions	2.8	3.5	6.3	1.1
Other and undefined	7.3	2.5	9.7	1.8
Total, Community services	33.6	56.6	90.2	16.3
Entertainment, recreation, restaurants, hotels and personal services —				
Entertainment and recreation services	3.8	2.8	6.6	1.2
Restaurants, hotels and clubs	6.3	10.4	16.7	3.0
Personal services	2.0	4.1	6.2	1.1
Other and undefined	0.1	0.2	0.2	—
Total, Entertainment, recreation, hotels and personal services	12.1	17.5	29.6	5.3
Inadequately described and not stated	19.8	17.4	37.2	6.7
TOTAL, EMPLOYED POPULATION	350.5	203.4	553.9	100.0

(a) Only those sub-divisions in which more than 5,539 persons (1 per cent of the total) were recorded are shown separately. (b) Including 'undefined', i.e. persons who could not be accurately assigned to one of the sub-divisions shown.

EMPLOYED POPULATION — INDUSTRY: CENSUS, 30 JUNE 1981
CLASSIFICATION ACCORDING TO STATISTICAL DIVISION
(Thousands)

Statistical division	Primary (in- cluding mining)	Manu- facturing ing	Con- struc- tion	Whole- sale and retail trade	Trans- port, storage, and com- muni- cation	Com- munity services	Entertain- ment, restaur- ants, hotels etc. (a)	Other indus- tries (b)	Total (all indus- tries)
MALES									
Perth Statistical Division	8.1	45.8	26.4	44.2	24.5	26.3	9.1	53.6	238.0
Other divisions —									
South-West	6.5	5.2	3.4	3.3	1.9	1.6	0.7	4.3	26.8
Lower Great Southern	4.5	0.9	1.0	1.8	0.9	0.8	0.3	1.6	11.8
Upper Great Southern	3.9	0.2	0.4	0.7	0.6	0.4	0.1	0.8	7.1
Midlands (c)	7.0	0.7	0.7	1.8	1.4	0.9	0.3	2.2	14.8
South-Eastern	5.4	1.0	1.0	1.4	1.2	0.8	0.4	2.0	13.2
Central	5.0	0.8	1.5	1.7	1.3	1.2	0.4	2.8	14.8
Pilbara	8.4	0.4	2.0	0.8	1.6	0.6	0.6	3.1	17.6
Kimberley	1.6	0.3	0.4	0.3	0.4	0.8	0.2	1.3	5.5
Total	42.5	9.5	10.4	11.8	9.2	7.2	3.0	18.1	111.6
Total, all divisions	50.5	55.3	36.8	55.9	33.7	33.5	12.1	71.7	349.5
Migratory (d)	0.1	—	—	—	0.4	—	—	0.3	1.0
Total males employed	50.7	55.3	36.8	55.9	34.0	33.6	12.1	72.0	350.5
FEMALES									
Perth Statistical Division	3.5	12.0	3.8	33.4	5.0	43.8	12.4	34.9	148.8
Other divisions —									
South-West	1.8	0.8	0.4	2.7	0.3	3.2	1.3	2.7	13.1
Lower Great Southern	1.9	0.3	0.2	1.2	0.2	1.4	0.5	1.3	7.0
Upper Great Southern	1.6	0.1	0.1	0.5	0.1	0.8	0.2	0.8	4.2
Midlands (c)	2.5	0.2	0.1	1.2	0.2	1.7	0.6	1.7	8.1
South-Eastern	0.8	0.1	0.1	1.1	0.2	1.5	0.7	1.2	5.8
Central	1.5	0.3	0.1	1.4	0.2	1.9	0.7	1.6	7.8
Pilbara	1.0	0.1	0.1	0.9	0.3	1.4	0.9	1.1	5.9
Kimberley	0.4	0.1	—	0.3	0.1	0.9	0.2	0.6	2.6
Total	11.5	1.9	1.1	9.3	1.7	12.8	5.1	11.0	54.5
Total, all divisions	15.1	13.9	4.9	42.8	6.7	56.6	17.5	45.9	203.3
Migratory (d)	—	—	—	—	—	—	—	—	0.1
Total females employed	15.1	13.9	4.9	42.8	6.7	56.6	17.5	45.9	203.4
PERSONS									
Perth Statistical Division	11.6	57.8	30.2	77.6	29.4	70.1	21.5	88.5	386.8
Other divisions —									
South-West	8.3	6.0	3.8	6.0	2.2	4.8	2.0	7.0	40.0
Lower Great Southern	6.4	1.2	1.2	3.0	1.1	2.3	0.8	2.9	18.7
Upper Great Southern	5.6	0.3	0.5	1.3	0.6	1.2	0.3	1.6	11.3
Midlands (c)	9.5	0.9	0.8	3.0	1.6	2.5	0.9	3.8	22.9
South-Eastern	6.3	1.1	1.1	2.5	1.4	2.4	1.1	3.2	19.0
Central	6.6	1.0	1.7	3.1	1.5	3.1	1.2	4.4	22.6
Pilbara	9.4	0.4	2.2	1.7	2.0	2.0	1.5	4.2	23.5
Kimberley	2.0	0.4	0.5	0.6	0.5	1.7	0.4	1.9	8.1
Total	54.0	11.4	11.5	21.1	10.9	20.0	8.1	29.1	166.1
Total, all divisions	65.6	69.2	41.7	98.7	40.3	90.1	29.6	117.5	552.9
Migratory (d)	0.1	—	—	—	0.4	—	—	0.4	1.0
Total persons employed	65.7	69.2	41.7	98.7	40.8	90.2	29.6	117.9	553.9

(a) Includes Sport and recreation and Personal services. (b) Comprises Electricity, gas and water; Finance, insurance, real estate and business services; Public administration and defence; and Inadequately described and not stated. (c) Includes Houtman Abrolhos (unincorporated). (d) Comprises persons (both passengers and crew) who, at midnight on census night, were enumerated on board ships in Western Australian ports, or ships which had left an Australian port before census night for a next port of call in Western Australia. It includes also those who were enumerated on long-distance trains, motor coaches or aircraft.

Classification according to Occupation

Occupation is defined as the nature of the work which a person performs, and implies *personal* performance. It may be based on the material treated, the process carried out or the type of service rendered by an *individual* worker. Thus the occupation of a person is the kind of work that he or she personally performs, as distinct from industry, which is defined as the *branch of productive activity, business or service carried out by the establishment in which a person is employed* and is not concerned with the nature of personal performance.

The Classification of Occupations used in the tabulation of the 1981 Census data has been adapted from and closely adheres to the principles embodied in the International Standard Classification of Occupations issued by the International Labour Office, Geneva, 1958 and as revised in 1968. The International Standard Classification of Occupations was prepared after extensive discussions and research by world experts in this field to provide an adequate classification framework for countries interested in occupational classification and, at the same time, provide a basis for international comparison of occupational data obtained mainly from Censuses of Population. The Australian Classification of Occupations contains 11 Major Groups, 73 Minor Groups and 389 Occupation Codes. In accordance with the International Standard Classification, occupations have been grouped according to the general similarity of the characteristics of the work which they entail.

EMPLOYED POPULATION — OCCUPATIONS: CENSUS, 30 JUNE 1981 (Thousands)

Major and minor group	Males	Females	Persons
Professional, technical and related workers —			
Architects, engineers and surveyors, professional	6.1	0.1	6.2
Chemists, physicists, geologists and other physical scientists	1.5	0.1	1.7
Biologists, veterinarians, agronomists and related scientists	1.2	0.3	1.4
Medical practitioners and dentists	2.3	0.4	2.7
Nurses, including probationers or trainees	0.7	11.2	11.9
Professional medical workers, n.e.c.	1.0	1.2	2.2
Teachers	9.4	12.9	22.4
Clergy and related members of religious orders	1.0	0.5	1.5
Law professionals	0.8	0.1	1.0
Artists, entertainers, writers and related workers	2.1	1.4	3.5
Draftsmen and technicians, n.e.c.	7.7	2.6	10.3
Other professional, technical and related workers	6.7	3.3	10.0
Total	40.7	34.1	74.8
Administrative, executive and managerial workers —			
Administrative and executive officials, government, n.e.c.	1.6	0.1	1.7
Employers, workers on own account, directors, managers, n.e.c.	31.8	7.4	39.2
Total	33.4	7.5	40.9
Clerical workers —			
Book-keepers and cashiers	1.8	6.4	8.1
Stenographers and typists	0.1	6.6	6.7
Other clerical workers	23.4	49.8	73.2
Total	25.2	62.8	88.0
Sales workers —			
Insurance, real estate salesmen, auctioneers and valuers	3.4	0.6	4.0
Commercial travellers and manufacturers' agents	3.6	0.6	4.2
Proprietors and shopkeepers, workers on own account, n.e.c., retail and wholesale trade, salesmen, shop assistants and related workers	13.1	23.4	36.5
Total	20.1	24.6	44.7
Farmers, fishermen, hunters, timber getters and related workers —			
Farmers and farm managers	20.3	8.9	29.3
Farm workers, including farm foremen	11.7	2.5	14.2
Wool classers	0.1	—	0.2
Hunters and trappers	0.1	—	0.1
Fishermen and related workers	1.4	0.1	1.5
Timber getters and other forestry workers	0.9	—	1.0
Total	34.6	11.6	46.2

EMPLOYED POPULATION — OCCUPATIONS: CENSUS, 30 JUNE 1981 — *continued*
(Thousands)

Major and minor group	Males	Females	Persons
Miners, quarrymen and related workers —			
Miners, mineral prospectors and quarrymen	5.4	0.2	5.6
Well drillers, oil, water and related workers	0.6	—	0.6
Mineral treaters	0.9	—	0.9
Total	7.0	0.2	7.2
Workers in transport and communication —			
Deck and engineer officers, ship	0.4	—	0.4
Deck and engine room hands, ship and boatmen	0.9	—	0.9
Aircraft pilots, navigators and flight engineers	0.4	—	0.4
Drivers and firemen, rail transport	1.1	—	1.1
Drivers, road transport	15.7	1.3	16.9
Guards and conductors, railway	0.4	—	0.4
Inspectors, supervisors, traffic controllers and dispatchers, transport	1.7	—	1.8
Telephone, telegraph and related telecommunication operators	0.4	1.9	2.3
Postmasters, postmen and messengers	1.9	0.6	2.5
Workers in transport and communications, n.e.c.	1.0	0.2	1.2
Total	23.9	4.0	27.9
Tradesmen, production-process workers and labourers, n.e.c. —			
Spinners, weavers, knitters, dyers and related workers	0.2	0.1	0.3
Tailors, cutters, furriers and related workers	1.2	1.4	2.6
Leather cutters, lasters, sewers (except gloves and garments) and related workers	0.2	0.1	0.3
Furnacemen, rollers, drawers, moulders and related metal making and treating workers	0.9	—	0.9
Precision instrument makers, watchmakers, jewellers and related workers	1.6	0.1	1.7
Toolmakers, metal machinists, mechanics, plumbers and related metal workers	34.9	0.2	35.0
Electricians and related electrical and electronics workers	12.7	0.1	12.8
Metal workers, metal and electrical production-process workers, n.e.c.	3.8	0.4	4.2
Carpenters, woodworking machinists, cabinetmakers and related workers	10.5	0.3	10.8
Painters and decorators	4.3	0.1	4.4
Bricklayers, plasterers and construction workers, n.e.c.	11.9	0.1	12.0
Compositors, printing machinists, engravers, bookbinders and related workers	2.2	0.6	2.8
Potters, kilnmen, glass and clay formers and related workers	0.6	0.1	0.7
Millers, bakers, butchers, brewers and related food and drink workers	4.8	1.3	6.2
Chemical, sugar and paper production process workers	0.9	0.1	1.0
Paper products, rubber, plastic and production process workers, n.e.c.	1.7	0.6	2.3
Packers, wrappers, labellers	0.4	1.1	1.5
Stationary engine, excavating and lifting equipment operators	7.2	0.1	7.3
Storemen and freight handlers	9.0	0.7	9.6
Labourers, n.e.c.	16.2	1.0	17.2
Apprentices, factory workers, foremen, machinists, (so described) n.e.c.	6.7	1.5	8.2
Total	131.8	10.0	141.8
Service, sport and recreation workers —			
Fire brigade, police and other protective service workers	5.5	0.3	5.8
Housekeepers, cooks, maids and related workers	3.2	12.8	16.0
Waiters, bartenders	1.0	4.8	5.8
Building caretakers, cleaners	3.0	6.7	9.6
Barbers, hairdressers and beauticians	0.5	2.5	3.0
Launderers, dry cleaners and pressers	0.3	1.0	1.3
Athletes, sportsmen and related workers	0.6	0.3	0.8
Photographers, and camera operators	0.4	0.1	0.5
Undertakers, and crematorium workers	0.1	—	0.1
Service, sports, recreation workers, n.e.c.	2.8	5.1	7.9
Total	17.3	33.6	50.8
Members of armed services	2.9	0.2	3.1
Occupation inadequately described or not stated	13.6	14.8	28.5
TOTAL EMPLOYED POPULATION	350.5	203.4	553.9

The Labour Force Survey

The Australian Statistician prepares estimates of the civilian labour force based on results of the population survey which is carried out on a sample basis throughout Australia each month. Selected private dwellings (houses, flats, etc.) and other dwellings (hotels, motels, etc.) are visited in the course of each survey. Information is obtained by means of personal interviews carried out by specially trained enumerators. The results of the survey are published

by the Australian Statistician in the monthly and annual releases entitled *The Labour Force* (Catalogue Nos. 6203.0 and 6204.0 respectively) and in the annual *Labour Statistics* (Catalogue No. 6101.0). The survey includes all persons aged fifteen years and over who were in one of the following categories: those who worked for one hour or more for payment or profit at any time during the survey week (the week preceding the interviews); those who had a job from which they were temporarily absent; those who were temporarily laid off without pay for the whole of the week; and those who did not work, did not have a job and were actively looking for work.

Persons helping but not receiving wages or salary who usually worked less than fifteen hours per week are excluded from the survey. Bonded trainees (including trainee teachers) and cadets engaged in full-time study at educational institutions are also excluded, even though the institution is conducted by their employer.

The unemployed members of the labour force are those persons who did no work during the survey week and either looked for work (having no job) or were temporarily laid off from a job.

The approach adopted at the 1981 Census in determining the labour force conforms closely to the recommendations of the Eighth International Conference of Labour Statisticians held at Geneva in 1954. Accordingly, any labour force activity of one hour or more during the survey week results in the person being counted in the labour force. Thus many persons whose main activity is not a labour force one (e.g. housewife, full-time student) are drawn into the labour force by virtue of part-time or occasional labour force activity in that week. On the other hand, the definition excludes persons who may frequently or usually participate in the labour force but who, during that week happened to have withdrawn from the labour force.

The following table shows estimates of the employment status of the civilian population of Western Australia since August 1976. The figures relate to all persons aged fifteen years and over except members of the permanent armed forces and certain diplomatic personnel customarily excluded from census and estimated populations.

CIVILIAN POPULATION 15 YEARS OF AGE AND OVER — EMPLOYMENT STATUS

Month of August	Employed		Unemployed		Total labour force		Not in labour force ('000)	Civilian population aged 15 and over ('000)
	Number ('000)	Per cent of labour force	Number ('000)	Per cent of labour force	Number ('000)	Per cent of pop-ulation		
MALES								
1976	343.1	96.8	11.3	3.2	354.4	83.3	71.1	425.5
1977	347.3	96.2	13.6	3.8	361.0	82.7	75.7	436.7
1978	335.8	94.2	20.8	5.8	356.6	79.3	93.1	449.7
1979	339.9	94.0	21.8	6.0	361.7	78.9	97.0	458.7
1980	352.9	94.5	20.8	5.6	373.6	79.4	97.0	470.6
1981	354.1	94.6	20.2	5.4	374.2	78.2	104.1	478.3
FEMALES								
1976	175.0	93.9	11.2	6.0	186.3	44.9	228.2	414.5
1977	178.7	93.3	12.8	6.7	191.5	44.9	235.3	426.8
1978	182.5	91.8	16.3	8.2	198.8	45.1	241.8	440.6
1979	186.0	90.6	19.4	9.4	205.4	45.7	244.4	449.8
1980	200.6	92.7	15.7	7.3	216.3	46.9	245.3	461.6
1981	202.2	92.5	16.3	7.5	218.5	46.2	254.5	473.0
PERSONS								
1976	518.1	95.8	22.5	4.2	540.6	64.4	299.3	840.0
1977	526.0	95.2	26.4	4.8	552.5	64.0	311.1	863.5
1978	518.3	93.3	37.1	6.7	555.4	62.4	334.9	890.3
1979	526.0	92.8	41.2	7.3	567.1	62.4	341.4	908.6
1980	553.4	93.8	36.5	6.2	589.9	63.3	342.3	932.2
1981	556.3	93.9	36.5	6.2	592.7	62.3	358.6	951.3

Government Employment

In addition to employment data provided by the census and the labour force survey, there are available monthly estimates of the numbers of persons employed by Commonwealth Government, State Government, and local government authorities.

Government employees comprise administrative employees and other employees of government bodies (Commonwealth, State, local and semi-government) on services such as railways, road transport, banks, postal and telecommunications, air transport, education (including universities, colleges of advanced education, etc.), radio, television, police, public works, factories, marketing authorities, public hospitals (other than those run by charitable or religious organisations) and departmental hospitals and institutions.

The numbers of employees shown in the following table have been derived from returns obtained from government bodies. Generally, Commonwealth Government employees are included in the figures if they are on the payroll on the last working day of the month, whereas for State and local government the reporting date is usually the last day of the last pay period ending in the month. Members of the permanent defence forces are not included.

GOVERNMENT AUTHORITIES — CIVILIAN EMPLOYEES IN WESTERN AUSTRALIA (Thousands)

June	Commonwealth Government (a)			State Government (a) (b)			Local Government (b)			Total (a) (b)		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
1976	16.6	6.6	23.3	59.1	36.6	95.7	6.7	1.3	8.0	82.4	44.6	127.0
1977	16.4	6.6	23.0	61.1	39.8	100.9	6.7	1.4	8.2	84.2	47.8	132.0
1978	16.3	6.8	23.1	62.2	41.7	103.9	7.3	1.7	8.9	85.8	50.2	136.0
1979	16.2	6.9	23.1	62.4	43.0	105.4	7.3	1.7	9.0	85.9	51.7	137.5
1980	16.1	7.1	23.3	62.8	44.5	107.3	7.3	1.8	9.1	86.2	53.4	139.6
1981	16.4	7.5	23.9	62.0	44.1	106.1	7.1	1.9	8.9	85.5	53.5	139.0

(a) Includes employees of semi-government authorities.

(b) Excludes a small number of employees engaged in agriculture.

COMMONWEALTH EMPLOYMENT SERVICE

The main functions of the Commonwealth Employment Service, established under the *Commonwealth Employment Service Act 1978*, are to assist people seeking employment to obtain positions best suited to their training, experience, abilities and qualifications and to assist employers seeking labour to obtain employees best suited to the kinds of work being offered.

Job information centres are provided in the metropolitan area and some country areas. Specialised assistance is provided for young people, the disabled, Aborigines, rural workers and persons with professional and technical qualifications.

Professional counselling provided without charge by a staff of qualified psychologists is available to any person, but it is provided particularly for those persons identified by officers of the Commonwealth Employment Service as being disadvantaged or suffering any major handicap with respect to employment. A Career Reference Centre in Perth enables members of the public to obtain information on vocational courses and provides them with the opportunity of investigating at leisure their career choices. The Centre provides information in a more extensive manner than is possible in an employment interview or when a visit is made to a school. Some Commonwealth Employment Service offices have Work Information Centres providing similar services. Another service is the provision of career materials to secondary educational institutions to assist with their conduct of career planning activities. Materials supplied by the vocational counselling service comprise Career Planning Packs and the Career Resource Guide.

The Commonwealth Employment Service also administers several Departmental manpower training programmes designed to assist industry to overcome skill shortages; assist individuals who, because of inadequate, inappropriate or outdated skills, have been displaced from the workforce; assist unemployed young people to find employment; and provide special

assistance to disadvantaged groups to find employment. There are three categories of schemes administered by the Commonwealth Employment Service to achieve these aims. These categories and their main features are shown below.

Skills Training. The General Training Assistance Programme in respect of skills training provides training allowances or on-the-job employer subsidies for occupations where there are not enough trained people to fill the job vacancies that exist.

Youth Training. Several programmes in this category are designed specifically to assist young people aged 15 to 24 years, who are having difficulty finding employment. The programmes provide the opportunity to learn work skills and/or gain experience on the job. One programme is the Special Youth Employment Training Programme which provides a subsidy to employers who employ and provide on-the-job training for young people who have been out of work for some time. The trainee is paid the award wage for the job and has the opportunity to learn employable skills and possibly remain permanently in the job.

Special Assistance. This is a category of programmes providing extra assistance to disadvantaged groups e.g. disabled and Aboriginal people. Assistance may be by way of formal course training allowances, higher on-the-job employer subsidies or by special employment training projects.

The Commonwealth Employment Service assists in placing in employment migrant workers sponsored by the Commonwealth Government under migration schemes.

In association with placement activities, surveys of the labour market are carried out, and detailed information is supplied to interested Commonwealth Government and State Government departments and instrumentalities and to the public. Employers, employees and other interested persons are advised on labour availability, industrial training and employment opportunities in various occupations, industries and areas and on other matters concerning employment.

The Commonwealth Rebate for Apprentice Full Time Training scheme applies to all apprentices taken on after 14 January 1977. It aims to encourage employers to train apprentices by subsidising the cost of releasing apprentices during paid working hours to attend or study a basic trade course of technical education or a formal off-the-job training course. The technical education rebate can apply during any year of apprenticeship but the off-the-job rebate applies only during the first year of apprenticeship.

In Western Australia at 30 April 1982 the Commonwealth Employment Service operated fourteen offices in Perth and suburbs, and there were offices at Albany, Bunbury, Broome, Carnarvon, Collie, Esperance, Geraldton, Kalgoorlie, Karratha, Kwinana, Mandurah, Manjimup, Merredin, Northam and Port Hedland. In addition nine Commonwealth Employment Service agencies were spread between Wyndham in the north and Busselton in the south.

Chapter X—continued

Part 3 — Prices

RETAIL PRICES AND PRICE INDEXES

Prices of a limited range of commodities are recorded in the Blue Books of Western Australia from the early years of settlement. Retail prices of food and groceries and average rentals of houses for years extending back to 1901 have been collected by the Australian Statistician, but it was not until 1911 that a systematic collection of retail price statistics was begun. These statistics were used to compile the 'A' Series Index, which covered food, groceries and house rents and was first compiled in 1912 with the year 1911 as base = 1,000. Four other indexes covering a wider range of commodities and services were compiled by the Australian Statistician at different times before the current Consumer Price Index was introduced in 1960 (retrospective to the September quarter of 1948).

Retail price indexes aim to measure the changes which occur in the general level of prices in a selected field. The basic principle of a price index is to select commodities and services representative of the field to be covered, and to combine their prices at regular intervals by the use of 'weights' which represent the relative importance of the several commodities and services in the selected field taken as a whole.

The items and standards priced are revised from time to time to keep them in harmony with changing conditions. Before each quarterly collection the standards of all items are reviewed after extensive inquiries among manufacturers, wholesalers and retailers. Where changes in the items or standards priced become necessary, suitable adjustments are made in compiling price series to ensure that they reflect only changes in prices for representative goods of constant quality and not differences in prices of differing standards.

Information concerning retail price indexes and their development in Australia is given in *Year Book Australia* (Catalogue No. 1301.0) and the *Labour Report*, No. 58 — 1973 (Ref. No. 6.7) published by the Australian Statistician, Canberra.

The Consumer Price Index. The Consumer Price Index measures quarterly changes in the price of a 'basket' of goods and services which account for a high proportion of expenditure by metropolitan wage-and-salary-earner households. The 'basket' covers a wide range of goods and services, arranged in the following groups: Food, Clothing, Housing, Household equipment and operations, Transportation, Tobacco and alcohol, Health and personal care, and Recreation and education. Each group is in turn divided into sub-groups and expenditure classes (i.e. groupings of like items). There are 105 expenditure classes, each with its own weight or measure of relative importance. In calculating the Index, price changes for the various expenditure classes are combined using those weights. Changes in the weighting pattern have been made at approximately five-yearly intervals to account for changes in spending patterns.

The Consumer Price Index is designed to measure price changes affecting a high proportion of metropolitan wage-and-salary-earner households (i.e. households located in the State capital cities, Canberra or Darwin) which derive at least three quarters of their total income from wages and salaries. The population group for the Consumer Price Index does, however, exclude the top 10 per cent (in terms of income) of such households.

The Index actually comprises ten series of price indexes linked to form a continuous series. The tenth series (i.e. the current series) was introduced as from the June quarter 1982 and incorporates the results of a comprehensive review carried out over a period of two years. The changes introduced in the current series are described in detail in the Information Paper: *Review of the Consumer Price Index* (Catalogue No. 6450.0) published by the Australian Statistician, Canberra. A summary of the main changes are as follows:

- (a) expansion of the geographic coverage of the Consumer Price Index to include a full city index for Darwin;
- (b) a change in the reference base from 1966-67 = 100 to 1980-81 = 100;
- (c) revision of the weighting pattern of the index to reflect, in general, estimated household expenditure in 1979-80;
- (d) inclusion in the regimen of the index of the following areas of expenditure —
 - (i) holiday travel and accommodation overseas,
 - (ii) education fees,
 - (iii) child care fees, and
 - (iv) pharmaceutical prescriptions;
- (e) a change in the timing and frequency of selected price collections.

Since the Consumer Price Index is designed to measure the impact of changing prices on metropolitan wage-and-salary-earner households, price movements are monitored in the kinds of retail outlets or other establishments where such households would normally purchase goods and services. This involves collecting prices from many sources including supermarkets, department stores, footwear stores, restaurants, garages, dental surgeries and hairdressers. Items such as bus, rail and air fares, electricity and gas charges, telephone charges, and local government rates are collected from the appropriate authorities and information on rents is obtained from property management companies. Approximately 85,000 separate price quotations are collected each quarter.

The pricing dates for the majority of items collected are spread over the three months of the quarter, with a concentration in the middle month. For those items whose prices fluctuate markedly in the short term, for example fresh fruit and vegetables, fresh meat, fresh fish and bread, prices continue to be collected monthly or more frequently while the items, seasonal clothing, local government rates and charges, and lawn mowers are priced only once a year.

The Consumer Price Index is compiled for each of the six State capital cities, Canberra and Darwin. The separate city indexes measure price movements within each city individually. They enable comparisons to be drawn between cities as to differences in the degree of price movement, but not as to differences in the price level.

In tables dealing with the Consumer Price Index, the figures appearing after the decimal point have little significance for general statistical purposes. They are inserted to avoid distortions that would occur in rounding off the figures to the nearest whole number.

Details of movements in the Consumer Price Index are published quarterly by the Australian Statistician, Canberra for the groups individually and for all groups combined. A detailed description of the Consumer Price Index appears in the *Labour Report*, No. 58 — 1973 (Ref. No. 6.7).

CONSUMER PRICE INDEX (a)

Group and selected sub-group	Index number					
	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
PERTH						
Food —	64.8	74.4	82.1	91.7	100.0	110.2
Dairy produce	71.6	77.7	82.8	89.2	100.0	112.8
Cereal products	72.7	78.8	84.2	90.8	100.0	112.2
Meat and seafoods	54.7	64.5	77.4	95.6	100.0	106.1
Fresh fruit and vegetables	66.0	82.5	90.0	89.4	100.0	114.3
Processed fruit and vegetables	76.4	83.4	88.9	93.4	100.0	108.0
Soft drinks, ice cream and confectionery	66.2	73.8	81.2	90.4	100.0	113.2
Meals out, take-away food	63.2	72.0	79.3	88.7	100.0	111.8
Other food	75.1	88.3	89.1	94.0	100.0	105.8
Clothing	73.1	81.2	87.0	92.9	100.0	107.2
Housing	77.2	85.1	89.2	92.5	100.0	109.0
Household equipment and operation	70.7	77.4	83.0	89.4	100.0	109.5
Transportation	67.0	73.1	81.1	90.6	100.0	111.9
Tobacco and alcohol	71.3	74.8	87.3	94.4	100.0	109.1
Health and personal care	77.3	91.7	84.5	96.6	100.0	130.9
Recreation and education (b)	n.a.					
All groups	70.2	77.8	84.1	91.9	100.0	111.2
SIX STATE CAPITAL CITIES COMBINED (c)						
Food —	64.3	71.3	79.5	90.7	100.0	108.6
Dairy produce	68.9	76.5	82.1	88.3	100.0	113.9
Cereal products	70.5	76.7	81.8	88.7	100.0	112.4
Meat and seafoods	54.2	59.6	74.3	95.7	100.0	102.4
Fresh fruit and vegetables	64.4	70.6	80.0	80.7	100.0	109.7
Processed fruit and vegetables	76.7	82.4	87.4	91.0	100.0	111.1
Soft drinks, ice cream and confectionery	65.5	73.6	79.9	89.2	100.0	114.3
Meals out, take-away food	67.0	74.2	80.6	90.7	100.0	110.0
Other food	71.2	83.7	84.2	91.4	100.0	105.6
Clothing	73.5	81.4	87.3	93.3	100.0	107.0
Housing	72.9	79.5	84.6	91.0	100.0	111.0
Household equipment and operation	72.4	78.4	83.3	90.0	100.0	110.6
Transportation	68.3	73.9	80.9	91.3	100.0	110.2
Tobacco and alcohol	71.6	74.7	86.4	93.6	100.0	109.2
Health and personal care	73.5	88.0	83.4	91.1	100.0	124.2
Recreation and education (b)	n.a.					
All groups	70.1	76.7	83.0	91.4	100.0	110.4

(a) Unless otherwise indicated, base of each Index is Year 1980-81 = 100.

(b) Base: March quarter 1982 = 100.

(c) Weighted average.

Retail Prices. The average retail prices of selected items of food and groceries in Perth are shown in the following table. The quantity units shown are those that were applicable in December quarter 1981. The prices shown are in some cases averages for periods of less than one year.

AVERAGE RETAIL PRICES OF SELECTED ITEMS — PERTH
(Cents)

Commodity	Unit	1979	1980	1981
Food —				
Milk, bottled, delivered	2 x 600 ml	53.5	58.0	67.2
Cheese, processed	500 g	n.a.	n.a.	138.8
Butter	500 g	91.2	101.8	120.8
Bread, milk loaf, sliced	680 g	58.5	65.2	74.2
Biscuits, dry	250 g	n.a.	51.0	57.2
Breakfast cereal, corn based	500 g	86.2	93.5	104.2
Flour, self-raising	1 kg	50.0	52.8	60.5
Rice, short grain	500 g	37.8	34.2	36.2
Beef — Rib (without bone)	1 kg	345.8	382.8	408.0
Rump steak	1 kg	562.2	617.8	619.0
T-bone, with fillet	1 kg	490.8	547.8	555.0
Chuck steak	1 kg	346.8	378.0	382.0
Silverside, corned	1 kg	378.2	420.5	430.0
Sausages	1 kg	184.5	201.8	222.8
Lamb — Leg	1 kg	343.8	388.0	423.0
Loin chops	1 kg	355.8	400.0	435.0
Forequarter chops	1 kg	323.8	367.5	406.0
Pork — Leg	1 kg	371.2	379.8	419.5
Loin chops	1 kg	362.2	381.5	427.2

AVERAGE RETAIL PRICES OF SELECTED ITEMS — PERTH — *continued*
(Cents)

Commodity	Unit	1979	1980	1981
<i>Food — continued</i>				
Chicken, frozen	1 kg	193.0	199.2	234.0
Bacon, middle rashers	250 g pkt	137.2	141.5	151.5
Beef, corned	340 g can	117.2	158.0	162.8
Salmon, pink	220 g can	107.5	120.5	123.2
Oranges	1 kg	69.5	68.2	82.8
Bananas	1 kg	108.5	106.0	119.8
Potatoes	1 kg	46.0	48.2	54.0
Tomatoes	1 kg	108.2	186.5	181.8
Carrots	1 kg	45.5	53.2	58.0
Onions	1 kg	55.8	53.0	117.2
Peaches	825 g can	70.8	73.8	82.0
Pineapple, sliced	450 g can	47.5	51.2	56.5
Peas, frozen	500 g pkt	60.5	61.5	69.8
Chocolate, milk, block	200 g	85.8	99.0	101.5
Eggs, 55 g	1 dozen	118.5	127.0	143.8
Sugar, white	2 kg	80.2	88.8	93.0
Jam, strawberry	500 g jar	96.5	99.5	99.8
Tea	250 g	75.2	73.8	72.5
Coffee, instant	150 g jar	257.5	283.5	274.5
Tomato sauce	600 ml	n.a.	n.a.	77.5
Margarine, table, poly-unsaturated	500 g	82.2	91.2	95.0
Baked beans (in tomato sauce)	440 g	n.a.	40.8	45.0
Baby food	125 g can	21.8	22.8	26.2
<i>Household supplies —</i>				
Laundry detergent	1 kg	n.a.	178.8	200.8
Dishwashing detergent	1 litre	n.a.	n.a.	165.3
Facial tissues	pkt of 224	n.a.	n.a.	102.3
Toilet paper	2 x 550 sheet rolls	n.a.	74.2	82.5
Pet food	405 g	36.2	40.8	43.8
<i>Motor vehicle operation —</i>				
Petrol, super grade	1 litre	n.a.	31.8	37.1
<i>Alcoholic beverages —</i>				
Beer — Chilled	750 ml bottle	90.8	94.8	103.8
Unchilled	12 x 750 ml bottles	n.a.	982.0	1,048.5
Draught beer, public bar	285 ml glass	n.a.	60.8	72.2
Scotch, nip, public bar	30 ml	98.8	108.5	117.2
<i>Personal care products —</i>				
Toilet soap	2 x 125 g	63.8	74.2	76.0
Toothpaste	140 g	n.a.	n.a.	99.7

If a detailed analysis of price movements is to be undertaken reference should be made to the appropriate copies of the publication *Average Retail Prices of Selected Items* (Catalogue No. 6403.0).

WHOLESALE PRICE INDEXES OF MATERIALS USED IN BUILDING

Two building material indexes are compiled and published by the Australian Statistician. They are the Price Index of Materials used in House Building and the Price Index of Materials used in Building other than House Building. Figures for both indexes are available from July 1966 on a monthly basis and for each financial year from 1966-67, and they were first published in November 1970 and April 1969 respectively. Index numbers are produced for each State capital city and for the six State capital cities combined. The reference base for the Price Index of Materials used in House Building is the year 1966-67 = 100.0. The Price Index of Materials used in Building other than House Building with a reference base 1966-67 = 100.0 was discontinued in January 1981. It was replaced by the revised Price Index of Materials used in Building other than House Building on a reference base 1979-80 = 100.0 in February 1981. They are fixed-weights indexes calculated by the method known as 'the weighted arithmetic mean of price relatives'.

Prices used in the indexes relate to specified standards, and are obtained in all State capital cities from representative suppliers of materials used in building. In the main they are collected as at the mid-point of the month to which the index refers.

The separate city indexes measure price movements in each State capital city individually. They enable comparisons to be drawn between capitals as to the difference in the degree of price movement from period to period but not as to differences in price level. Figures are published to one decimal place to avoid distortions that would occur in rounding off the index numbers to the nearest whole number.

Information additional to that shown in the following sections, as well as detailed group index numbers for each State capital city, is given in the *Labour Report*, No. 58 — 1973 (Ref. No. 6.7), and the monthly publications *Price Index of Materials used in House Building* (Catalogue No. 6408.0) and *Price Index of Materials used in Building other than House Building* (Catalogue No. 6407.0) issued by the Australian Statistician, Canberra.

House Building. The Wholesale Price Index of Materials used in House Building measures changes in prices of selected materials used in the construction of houses. Its composition is in accordance with the usage of materials in actual houses which were selected as representative for the purpose. The index does not purport to represent buildings of any kind other than houses. The house building construction types included are those which use brick, brick veneer, timber, or asbestos-cement sheeting as the principal material for the outer walls. In all cases the selection of materials was based on local usage. The index includes some fifty items which are combined in eleven groups in addition to the 'All groups' index. Some items carry the weight of similar items not directly priced. They are described in terms of fixed specifications with the aim of recording price changes for representative materials of constant quality. The items and weights were derived from reported values of each material used in selected representative houses constructed in or about the year 1968-69 in each State capital city. The selection took account, within the four major construction types, of a range of characteristics of these houses, e.g. internal partitions, windows, roofing, etc., as well as whether such things as paths and fences were included in the job.

WHOLESALE PRICE INDEX OF MATERIALS USED IN HOUSE BUILDING (Base of each Index: Year 1966-67 = 100.0)

Group	Value weight (per cent)	Index number					
		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
PERTH							
Concrete mix, cement and sand	7.94	174.8	197.6	219.8	229.5	250.9	283.0
Cement products	8.14	214.6	248.3	280.8	296.1	324.1	358.0
Clay bricks, tiles, etc.	16.44	223.4	251.8	274.9	289.8	324.8	361.5
Timber, board and joinery	29.60	212.9	240.9	269.0	284.4	311.9	355.1
Steel products	6.07	232.6	263.1	286.1	303.0	334.9	374.3
Other metal products	7.69	179.9	197.5	205.4	224.6	273.9	308.0
Plumbing fixtures, etc.	4.59	181.5	224.5	251.4	262.8	301.7	346.6
Electrical installation materials	1.76	187.1	204.0	213.8	236.9	277.2	311.9
Installed appliances	4.12	159.5	172.4	176.7	184.6	198.8	216.0
Plaster and plaster products	4.01	147.7	170.5	185.8	194.1	210.0	247.1
Miscellaneous materials	9.64	194.0	230.8	259.8	277.9	318.4	360.8
All groups	100.00	201.9	229.8	253.4	268.2	299.4	337.6
SIX STATE CAPITAL CITIES COMBINED (a)							
Concrete mix, cement and sand	5.73	195.1	217.8	239.0	255.5	292.8	334.1
Cement products	8.10	227.0	258.9	284.6	303.8	336.3	383.1
Clay bricks, tiles, etc.	12.85	205.1	227.8	245.8	262.2	294.8	334.9
Timber, board and joinery	36.16	226.2	254.1	275.0	290.8	331.5	377.8
Steel products	5.86	229.3	263.2	287.7	307.6	341.0	389.4
Other metal products	7.20	187.1	207.9	220.1	239.7	281.7	314.6
Plumbing fixtures, etc.	3.74	201.5	224.3	239.1	244.1	278.1	319.3
Electrical installation materials	1.63	183.5	201.8	215.5	240.0	282.1	316.0
Installed appliances	5.13	165.9	181.9	193.3	202.9	217.6	240.6
Plaster and plaster products	5.64	167.7	178.8	191.8	204.3	222.8	244.6
Miscellaneous materials	7.96	187.9	210.7	230.4	248.2	278.2	319.6
All groups	100.00	208.1	232.9	252.0	268.1	302.9	344.0

(a) Weighted average.

Building other than House Building. The Wholesale Price Index of Materials used in Building other than House Building measures changes in prices of selected materials used in the construction of buildings other than houses. Its composition is in accordance with the materials usage in actual building projects which were selected as representative for the purpose. The building 'use-types' (e.g. office building, factory, etc.) directly represented are flats; offices; factories; health buildings (i.e. hospitals, nurses' quarters, clinics, etc.); education buildings (i.e. schools, universities, kindergartens, etc.); and commercial premises including hotels, hostels, etc., shops, and other business premises. The index includes sixty-eight items combined into ten 'industry of origin' groups in addition to an 'All groups' index. The table below shows indexes for selected major building materials and special combinations of building materials.

Although the selected materials (or many of them) are also used in house building, in building repair, maintenance and alteration work, and in 'engineering construction' work (e.g. projects such as roads, dams, bridges and the like), the weighting pattern of the index, being designed for the specific purpose mentioned earlier, is not applicable to these other activities of the construction industry. In addition, since the weights are based on an average materials usage over the stated range of building use-types, the index is not necessarily applicable to any specific building or any of the separate use-types.

**WHOLESALE PRICE INDEX OF MATERIALS USED IN BUILDING
OTHER THAN HOUSE BUILDING**
(Base of each Index: Year 1979-80 = 100.0)

Particulars	Index number		
	1979-80	1980-81	1981-82
PERTH			
Selected major building materials —			
Structural timber	100.0	116.9	129.1
Clay bricks	100.0	110.3	121.4
Ready mixed concrete	100.0	105.7	115.6
Structural steel	100.0	116.1	131.2
Aluminium windows	100.0	110.0	118.9
Builders hardware	100.0	113.4	125.1
Special combinations of building materials —			
All electrical materials	100.0	110.8	123.3
All mechanical services components	100.0	111.6	123.9
All plumbing materials	100.0	110.3	120.4
All groups	100.0	112.2	123.8
SIX STATE CAPITAL CITIES COMBINED (a)			
Selected major building materials —			
Structural timber	100.0	113.5	123.4
Clay bricks	100.0	114.2	128.3
Ready mixed concrete	100.0	113.2	123.7
Structural steel	100.0	114.5	128.1
Aluminium windows	100.0	112.5	126.3
Builders hardware	100.0	113.6	127.7
Special combinations of building materials —			
All electrical materials	100.0	109.7	122.0
All mechanical services components	100.0	111.0	123.5
All plumbing materials	100.0	110.7	122.2
All groups	100.0	112.9	125.4

(a) Weighted average.

The items in the revised index were selected and allocated weights in accordance with the estimated average values of materials used in the construction of buildings (other than houses) commenced in the six State capital cities in the three years ended June 1977. The estimated values were derived from data reported from a sample of actual building projects selected from ABS building commencements statistics. The same weighting pattern is used for all State capital cities and is applied to local price measures for calculating index numbers for each State capital city. The index for the six State capital cities combined is a weighted average of individual city indexes.

OTHER PRICE INDEXES

In addition to the price indexes already described, the Australian Statistician compiles indexes relating to prices of selected export commodities, metallic materials, materials used in manufacturing industry and articles produced by manufacturing industry. Data are published in monthly releases *Export Price Index* (Catalogue No. 6405.0), *Price Index of Metallic Materials* (Catalogue No. 6410.0), *Price Index of Materials used in Manufacturing Industry* (Catalogue No. 6411.0) and *Price Indexes of Articles Produced by Manufacturing Industry* (Catalogue No. 6412.0). Further reference to these indexes will be found in *Year Book Australia* (Catalogue No. 1301.0) and the *Labour Report* No. 58 — 1973 (Ref. No. 6.7), published by the Australian Statistician, Canberra.

STATISTICAL SUMMARY

The following pages contain an historical summary of some of the more important statistics relating to Western Australia.

The first year shown on each page is the earliest for which any series on that page is available.

Figures shown in these tables are the latest available at the time of publication; in some cases they may not be strictly comparable with those shown in earlier years.

ESTIMATED POPULATION, NATURAL INCREASE AND MIGRATION (a)

NOTE. Figures above the double lines exclude full-blood Aborigines; those below the double lines refer to total population, i.e. including Aborigines.

Year	Population at 31 December (b)			Population increase (c)				Mean population (b)		Popula- tion of Perth Statistical Division (b) (d)
	Males	Females	Persons	Recorded natural increase (e)	Estimated net migration (f)	Total increase (g)		Year ended —		
						Number	Per cent (h)	30 June	31 Dec- ember	
(000)										
1829	769	234	1,003	n.a.	n.a.	n.a.	n.a.			
1830	877	295	1,172	n.a.	n.a.	169	16.85		n.a.	
1840	1,434	877	2,311	34	123	157	7.29			
1850	3,576	2,310	5,886	132	1,109	1,241	26.72			n.a.
1860	9,597	5,749	15,346	379	130	509	3.43	n.a.	15,092	
1870	15,511	9,624	25,135	475	7	482	1.96		24,894	
1880	16,985	12,576	29,561	551	129	422	1.45		29,350	
1890	28,854	19,648	48,502	1,021	1,821	2,842	6.22		47,081	20
1900	110,088	69,879	179,967	3,214	6,495	9,709	5.70		175,113	73
1910	157,971	118,861	276,832	4,845	6,312	11,157	4.20	266,686	271,019	115.7
1920	176,895	154,428	331,323	4,761	1,298	3,463	1.06	327,152	330,023	167.0
1930	232,868	198,742	431,610	5,426	453	4,973	1.17	425,785	429,079	235.1
1940	248,734	225,342	474,076	4,598	2,902	1,696	0.36	472,060	473,397	255.5
1941	246,842	226,371	473,213	4,906	5,769	863	0.18	474,180	473,988	260.0
1942	246,816	229,839	476,655	3,791	349	3,442	0.73	474,833	476,619	265.6
1943	246,389	231,875	478,264	5,137	3,528	1,609	0.34	476,989	476,745	272.3
1944	249,301	235,474	484,775	5,857	654	6,511	1.36	478,271	481,498	281.2
1945	251,590	238,498	490,088	5,418	105	5,313	1.10	484,720	487,510	289.0
1946	255,310	241,663	496,973	7,277	392	6,885	1.40	489,982	492,771	297.9
1947	261,653	247,109	508,762	8,119	3,670	11,789	2.37	497,006	502,951	307.3
1948	268,304	253,695	521,999	8,246	4,991	13,237	2.60	508,747	514,621	315.8
1949	280,273	263,911	544,184	8,721	13,464	22,185	4.25	521,932	532,603	331.4
1950	294,758	277,891	572,649	9,170	19,295	28,465	5.23	545,134	557,878	351.7
1951	304,454	285,885	590,339	9,506	8,184	17,690	3.09	570,346	580,317	362.8
1952	316,700	296,235	612,935	10,204	12,392	22,596	3.83	589,887	600,615	378.1
1953	326,372	305,371	631,743	10,790	8,018	18,808	3.07	611,191	621,034	390.1
1954	334,342	314,365	648,707	10,564	6,400	16,964	2.69	630,705	639,963	402.2
1955	343,838	324,771	668,609	11,244	8,658	19,902	3.07	648,222	657,323	416.8
1956	350,333	330,935	681,268	11,344	1,315	12,659	1.89	666,898	674,459	427.4
1957	356,195	339,039	695,234	11,627	2,339	13,966	2.05	680,949	687,448	438.9
1958	361,441	345,755	707,196	11,777	785	11,962	1.72	693,568	699,915	449.3
1959	366,253	352,438	718,691	11,614	119	11,495	1.63	705,869	711,737	459.5
1960	372,665	358,368	731,033	11,229	1,113	12,342	1.72	717,316	722,900	470.3
1961	384,773	370,440	755,213	11,349	2,571	13,920	1.90	729,770	737,596	482.7
1962	395,891	381,357	777,248	11,254	10,499	22,035	2.92	755,770	766,205	500.3
1963	407,024	391,871	798,895	11,314	10,068	21,647	2.79	777,413	788,457	517.8
1964	417,023	401,098	818,121	10,256	8,705	19,226	2.41	798,824	808,300	534.0
1965	427,330	410,918	838,248	9,912	9,963	20,127	2.46	817,157	826,481	550.9
1966	440,913	423,180	864,093	10,292	15,553	25,845	3.08	837,290	849,189	571.8
1967	458,438	438,550	896,988	11,244	21,651	32,895	3.81	863,539	879,815	597.7
1968	479,938	457,862	937,800	12,073	28,739	40,812	4.55	896,761	915,757	629.2
1969	500,378	476,242	976,620	13,404	25,416	38,820	4.14	935,985	955,660	659.7
1970	520,174	493,878	1,014,052	14,075	23,357	37,432	3.83	975,063	994,201	689.6
1971r	547,563	522,784	1,070,347	16,433	16,352	33,033	3.26	1,013,455	1,052,785	733.6
1972r	558,030	534,574	1,092,604	14,780	7,875	22,257	2.08	1,068,972	1,081,634	755.5
1973r	568,500	545,482	1,113,982	12,700	8,910	21,378	1.96	1,091,845	1,101,921	777.1
1974r	584,552	561,439	1,145,991	12,506	19,700	32,009	2.87	1,113,723	1,127,887	806.5
1975r	594,518	572,885	1,167,403	12,411	9,410	21,412	1.87	1,142,777	1,155,499	828.8
1976r	606,006	585,892	1,191,898	12,972	13,171	24,495	2.10	1,166,902	1,178,982	849.1
1977r	619,005	599,963	1,218,968	12,815	16,991	27,070	2.27	1,191,806	1,205,165	866.8
1978r	629,825	611,867	1,241,692	12,880	22,724	22,724	1.86	1,218,815	1,231,198	881.4
1979r	639,293	623,767	1,263,060	12,499	11,605	21,368	1.72	1,242,382	1,253,373	894.9
1980r	649,411	635,669	1,285,080	12,505	12,251	22,020	1.74	1,263,183	1,273,302	908.9
1981p	665,559	651,908	1,317,467	13,905	19,850	32,387	2.52	1,285,523	1,300,592	931.0

(a) Estimates for years prior to 1977 are based on final census results; those for 1977 and later are subject to revision. (b) Figures for 1971 and later refer to the estimated resident population. (c) Minus sign (—) denotes decrease. (d) At 31 December. (e) Excess of births registered over deaths registered, including deaths of defence personnel, whether in Australia or overseas, between September 1939 and June 1947. Figures prior to 1972 are on a State of registration basis; those for 1972 and later are on the basis of State of usual residence. (f) Interstate and overseas. (g) For the years 1972 to 1981 discrepancies between the sum of natural increase and net migration, and total increase, are due to intercensal discrepancy. (h) The rates represent total increase in population during the year expressed as a proportion per cent of the population at the end of the previous year.

VITAL STATISTICS

NOTE. Figures for 1965 and earlier (i.e. those above the double lines) exclude full-blood Aborigines; later figures refer to total population, i.e. including Aborigines.

Year	Marriages registered	Live births registered	Deaths registered (a)	Natural increase (b)	Rate per 1,000 of mean population (c)				Infant mortality	
					Marriages	Births	Deaths (a)	Natural increase (b)	Number (d)	Rate (e)
1840	25	54	20	34	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1850	37	186	54	132	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1860	151	588	209	379	10.01	38.96	13.85	25.11	n.a.	n.a.
1870	153	853	378	475	6.15	34.27	15.18	19.08	100	117.23
1880	214	933	382	551	7.29	31.79	13.02	18.77	72	77.17
1890	278	1,561	540	1,021	5.90	33.16	11.47	21.69	140	89.69
1900	1,781	5,454	2,240	3,214	10.17	31.15	12.79	18.35	688	126.15
1910	2,107	7,585	2,740	4,845	7.77	27.99	10.11	17.88	593	78.18
1920	2,932	8,149	3,388	4,761	8.88	24.69	10.27	14.42	538	66.02
1930	3,205	9,200	3,774	5,426	7.47	21.44	8.80	12.64	430	46.74
1931	2,741	8,549	3,681	4,868	6.34	19.77	8.51	11.26	355	41.53
1932	2,904	7,965	3,715	4,250	6.68	18.31	8.54	9.77	355	44.57
1933	3,374	7,874	3,790	4,084	7.69	17.95	8.64	9.31	290	36.83
1934	3,682	7,801	4,076	3,725	8.32	17.64	9.21	8.42	319	40.89
1935	3,940	8,119	4,118	4,001	8.82	18.17	9.22	8.95	326	40.15
1936	4,242	8,479	4,230	4,249	9.38	18.75	9.35	9.39	358	42.22
1937	4,169	8,609	4,065	4,544	9.12	18.82	8.89	9.94	323	37.52
1938	4,153	9,141	4,234	4,907	8.95	19.71	9.13	10.58	309	33.80
1939	4,195	9,036	4,336	4,700	8.93	19.23	9.23	10.00	369	40.84
1940	5,234	9,121	4,486	4,635	11.06	19.27	9.48	9.79	403	44.18
1941	5,077	10,118	4,769	5,349	10.71	21.35	10.06	11.29	357	35.28
1942	5,441	9,901	5,076	4,825	11.42	20.77	10.65	10.12	365	36.86
1943	4,528	10,481	4,587	5,894	9.50	21.98	9.62	12.36	342	32.63
1944	4,506	10,870	4,478	6,392	9.36	22.58	9.30	13.28	354	32.57
1945	3,788	10,672	4,712	5,960	7.77	21.89	9.67	12.23	315	29.52
1946	5,171	12,105	4,753	7,352	10.49	24.57	9.65	14.92	376	31.06
1947	5,282	12,874	4,723	8,151	10.50	25.60	9.39	16.21	398	30.92
1948	5,186	12,931	4,685	8,246	10.08	25.13	9.10	16.02	331	25.60
1949	4,951	13,511	4,790	8,721	9.30	25.37	8.99	16.37	357	26.42
1950	5,434	14,228	5,058	9,170	9.74	25.50	9.07	16.44	386	27.13
1951	5,390	14,794	5,288	9,506	9.29	25.49	9.11	16.38	425	28.73
1952	5,389	15,413	5,209	10,204	8.97	25.66	8.67	16.99	384	24.98
1953	5,032	15,862	5,072	10,790	8.10	25.54	8.17	17.37	378	23.83
1954	5,204	15,928	5,364	10,564	8.13	24.89	8.38	16.51	359	22.54
1955	5,145	16,623	5,379	11,244	7.83	25.29	8.18	17.11	373	22.44
1956	5,080	16,916	5,572	11,344	7.53	25.08	8.26	16.82	384	22.70
1957	4,897	16,924	5,297	11,627	7.12	24.62	7.71	16.91	357	21.09
1958	5,038	16,731	5,554	11,177	7.20	23.90	7.94	15.97	360	21.52
1959	5,387	17,111	5,497	11,614	7.57	24.04	7.72	16.32	345	20.16
1960	5,323	16,926	5,697	11,229	7.36	23.41	7.88	15.53	366	21.62
1961	5,150	17,078	5,729	11,349	6.98	23.15	7.77	15.39	336	19.67
1962	5,466	17,064	5,810	11,254	7.23	22.58	7.69	14.89	380	22.27
1963	5,755	17,290	5,976	11,314	7.40	22.23	7.68	14.55	353	20.42
1964	6,023	16,685	6,429	10,256	7.55	20.93	8.06	12.86	328	19.66
1965	6,448	16,186	6,274	9,912	7.91	19.85	7.70	12.16	351	21.68
1966	7,002	17,194	6,902	10,292	8.25	20.25	8.13	12.12	343	19.95
1967	7,430	18,023	6,779	11,244	8.44	20.48	7.71	12.78	314	17.42
1968	8,086	19,541	7,468	12,073	8.83	21.34	8.16	13.18	398	20.37
1969	8,993	20,754	7,350	13,404	9.41	21.72	7.69	14.03	453	21.83
1970	9,227	21,618	7,543	14,075	9.28	21.74	7.59	14.16	459	21.23
1971	9,382	24,239	7,806	16,433	8.91	23.02	7.41	15.61	464	19.14
1972	9,120	22,177	7,441	14,736	8.43	20.50	6.88	13.62	348	15.69
1973	9,102	20,510	7,845	12,665	8.26	18.61	7.12	11.49	394	19.21
1974	9,295	20,207	7,778	12,429	8.24	17.92	6.90	11.02	327	16.18
1975	9,026	20,338	7,972	12,366	7.81	17.60	6.90	10.70	271	13.32
1976	9,517	20,670	7,740	12,930	8.07	17.53	6.56	10.97	273	13.21
1977	10,063	20,651	7,899	12,752	8.35	17.14	6.55	10.58	251	12.15
1978	9,404	20,611	7,794	12,817	7.64	16.74	6.33	10.41	230	11.16
1979	9,239	20,469	8,020	12,449	7.37	16.33	6.40	9.93	247	12.07
1980	9,594	20,607	8,166	12,441	7.53	16.18	6.41	9.77	239	11.60
1981	10,111	21,877	7,993	13,884	7.77	16.82	6.15	10.68	193	8.82

(a) Excludes deaths of defence personnel, whether in Australia or overseas, between September 1939 and June 1947. (b) Excess of Live births registered over Deaths registered, on a State of registration basis; see also note (a). (c) Rates for 1971 and later are based on the estimated resident population. Figures for 1971 to 1980 have been revised. Rates for years prior to 1977 are based on final census results. (d) Deaths under 1 year of age; included in Deaths registered. (e) Per 1,000 live births.

PUBLIC REVENUE AND EXPENDITURE: CONSOLIDATED REVENUE FUND
(\$'000)

Year (a)	Revenue					Expenditure						
	Common-wealth funds	Public utilities	Departmental (b)	Taxation	Territorial (c)	Total revenue	Public utilities	Interest and sinking fund	Departmental			Total expenditure
									Education	Health	Other	
1840					5	34			n.a.			30
1850					4	38		n.a.	n.a.			33
1860					35	140			3			123
1870	n.a.	n.a.	n.a.	n.a.	40	196	n.a.		7	n.a.	n.a.	226
1880					72	360		40	19			409
1890					217	829		144	23			803
1900		2,612	182	244	380	5,751	1,863	880	138	198	2,049	5,231
1910	1,407	3,916	551	673	649	7,315	2,440	2,006	367	328	1,533	6,895
1920	1,197	6,364	1,188	1,688	818	11,727	5,156	4,124	829	642	1,931	13,063
1921	1,188	7,517	1,618	1,911	875	13,579	6,290	4,459	980	590	2,231	14,953
1922	1,168	7,787	1,822	1,762	870	13,814	6,120	4,875	1,112	540	2,172	15,278
1923	1,166	8,000	2,092	1,975	807	14,415	5,847	5,150	1,126	538	2,100	15,226
1924	1,171	8,776	2,173	2,347	925	15,731	6,065	5,668	1,161	544	2,229	16,190
1925	1,176	9,154	2,576	2,448	1,004	16,763	6,195	6,193	1,171	587	2,191	16,880
1926	1,177	9,280	2,831	2,836	1,083	17,616	6,577	6,596	1,010	610	2,400	17,815
1927	2,306	9,941	3,274	2,423	1,102	19,502	6,958	6,590	1,294	604	3,351	19,445
1928	1,618	10,589	3,205	2,593	1,222	19,616	7,467	6,358	1,337	606	3,246	19,669
1929	1,623	10,772	3,312	2,740	1,029	19,896	7,885	6,671	1,358	634	3,278	20,448
1930	1,547	10,596	3,134	2,906	950	19,501	8,073	6,891	1,385	649	2,872	20,537
1931	1,547	9,228	3,279	2,269	678	17,374	6,654	7,243	1,346	486	3,950	20,215
1932	1,547	8,818	2,766	2,014	585	16,071	5,724	7,015	1,098	328	4,543	19,186
1933	1,947	8,873	2,701	2,257	558	16,664	5,682	7,009	1,108	333	3,761	18,392
1934	2,147	8,867	2,240	2,737	626	16,963	5,870	7,095	1,153	309	3,560	18,541
1935	2,413	9,837	1,562	3,804	812	18,663	6,391	7,100	1,225	326	3,342	18,997
1936	2,617	10,366	1,677	4,372	767	20,067	6,756	7,135	1,331	341	3,595	19,891
1937	2,013	10,633	1,727	4,807	773	20,371	7,247	7,237	1,432	381	4,024	21,113
1938	2,097	11,148	1,980	5,190	749	21,638	7,249	7,579	1,474	380	4,158	21,659
1939	2,087	11,159	1,786	5,728	634	21,899	7,857	7,779	1,514	401	3,992	22,340
1940	2,137	11,102	1,942	5,992	632	22,240	7,662	8,021	1,545	416	4,070	22,534
1941	2,247	11,366	1,916	6,255	638	22,864	7,534	8,114	1,568	421	4,262	22,842
1942	2,207	12,133	2,204	6,222	620	23,880	8,282	8,204	1,662	436	4,293	23,877
1943	7,852	13,518	2,497	1,330	634	26,303	9,377	8,183	1,627	458	5,564	26,254
1944	7,935	13,626	2,868	1,553	700	27,178	9,870	8,185	1,747	506	5,780	27,102
1945	8,044	13,618	3,402	1,715	697	27,908	10,064	8,251	1,778	485	6,261	27,899
1946	9,960	13,303	2,519	1,936	709	28,815	10,825	8,168	2,005	1,010	5,621	28,815
1947	11,461	11,769	3,105	2,138	1,053	29,962	10,866	8,012	2,447	1,369	5,910	30,057
1948	14,515	13,242	3,575	2,354	1,202	35,421	13,996	8,089	3,298	1,841	7,280	36,125
1949	17,136	15,032	4,564	2,683	1,106	41,121	16,720	8,215	3,519	2,613	9,942	42,756
1950	22,975	17,792	5,733	3,240	1,225	51,622	20,237	8,508	4,160	3,633	13,096	51,574
1951	25,343	19,085	5,911	3,912	1,230	56,312	21,974	8,994	5,269	4,465	13,180	55,994
1952	29,923	24,335	6,863	4,633	1,300	67,910	27,490	9,741	7,262	6,269	15,696	69,094
1953	39,056	22,385	8,557	5,247	1,513	77,768	32,044	10,611	8,686	6,926	17,639	78,784
1954	38,342	29,860	8,378	6,468	1,929	86,292	35,234	12,147	9,503	7,675	18,797	86,497
1955	38,759	32,645	9,433	7,258	2,014	91,440	36,089	13,857	11,217	8,026	19,838	92,408
1956	43,373	33,969	9,779	8,036	2,498	99,225	39,184	15,451	12,482	9,344	21,501	102,886
1957	46,759	37,133	12,548	9,027	2,433	108,662	42,022	17,043	13,636	10,067	33,645	112,487
1958	51,808	34,525	13,640	10,729	2,516	114,108	40,103	19,303	15,172	11,026	25,572	116,355
1959	55,496	36,080	14,522	10,368	2,783	120,136	40,317	20,844	15,819	11,967	29,244	123,506
1960	58,871	38,575	15,696	11,834	2,878	128,776	42,418	23,053	17,282	13,565	29,861	131,587
1961	65,519	40,830	16,372	12,079	2,797	138,665	41,072	24,628	19,541	15,018	35,160	141,075
1962	73,430	42,456	16,549	12,926	3,283	149,852	42,097	27,250	21,417	14,935	40,131	151,780
1963	75,847	43,559	18,134	14,762	3,501	157,182	42,267	29,980	22,850	16,073	41,254	158,687
1964	78,988	45,376	20,948	17,604	3,751	167,888	44,247	31,771	25,880	18,705	43,430	170,681
1965	88,565	39,778	26,712	19,512	4,107	180,143	43,360	34,669	29,133	21,160	49,401	184,840
1966	103,459	45,683	28,753	22,574	4,598	206,655	47,106	37,926	34,016	23,086	56,869	206,665
1967	106,748	52,787	31,461	27,536	7,655	228,146	53,182	41,662	36,746	26,429	61,512	228,174
1968	112,617	56,226	33,135	34,916	11,845	250,738	60,728	43,864	41,224	29,294	65,362	249,909
1969	126,621	54,407	33,035	41,602	17,301	275,081	64,016	47,083	46,441	33,613	74,822	276,135
1970	141,326	62,921	36,905	50,865	23,633	318,189	71,166	51,427	55,839	41,343	87,660	318,901
1971	170,396	68,350	45,583	48,434	32,187	367,252	79,717	54,178	66,341	52,575	107,129	371,620
1972	180,132	73,446	54,131	78,490	34,992	423,999	82,410	62,029	82,472	59,862	125,260	424,890
1973	200,633	69,158	66,711	97,141	37,162	473,840	88,372	65,280	94,547	71,866	144,005	477,330
1974	232,111	85,291	76,306	126,929	43,346	567,683	104,178	69,200	115,982	100,841	168,122	573,414
1975	313,846	108,921	96,930	160,307	49,010	734,240	121,494	75,300	165,705	148,161	213,042	743,373

(a) From 1900, year ended 30 June. (b) Reimbursements, fees, etc. (c) Revenue from sales, leases, licences and royalties relating to land, mining and timber:

NOTE. This table has been replaced by a new series 'State and Local Authorities: Receipts and Outlay' on a later page.

NET EXPENDITURE FROM LOAN FUNDS; PUBLIC DEBT (\$'000)

Net expenditure from loan funds on public works and services (b)								Public debt (at end of year)	
Year (a)	Railways, tramways and omnibuses	Electricity supply	Harbours, rivers, light- houses, etc.	Water supplies, sewerage, drainage and irrigation	Public buildings	Other	Total	Gross amount outstand- ing	Sinking fund
1860	—	—	—	—	—	—	—	4	—
1870	—	—	—	—	—	—	—	—	—
1880	(c) 549	(d) 38	—	—	—	n.a.	(d) 802	722	n.a.
1890	3	6	2	(e) 76	—	n.a.	32	2,735	170
1900	302	395	949	—	—	110	1,757	23,349	754
1910	908	174	199	152	—	626	2,058	46,575	5,139
1920	242	204	94	21	—	4,765	5,327	93,644	13,656
1921	398	237	427	50	—	4,061	5,173	98,079	15,283
1922	1,207	183	435	89	—	2,996	4,910	109,920	16,740
1923	1,359	240	402	37	—	4,740	6,779	116,972	17,562
1924	1,303	278	871	177	—	5,244	7,874	125,532	18,747
1925	1,243	362	1,301	182	—	5,110	8,198	128,987	19,970
1926	1,540	439	1,357	156	—	4,667	8,157	140,022	21,309
1927	1,559	382	884	235	—	4,901	7,960	141,212	17,514
1928	1,902	530	1,132	256	—	4,577	8,397	152,856	17,798
1929	1,825	528	1,092	182	—	4,255	7,882	(f) 138,711	(f) 1,983
1930	1,819	529	610	108	—	4,226	7,291	142,389	2,081
1931	878	257	420	—	—	1,457	3,012	153,130	2,621
1932	263	155	1,152	—	—	1,055	2,624	159,416	2,618
1933	374	485	1,355	69	—	1,838	4,121	167,029	2,693
1934	659	492	1,606	196	—	2,344	5,297	171,696	743
1935	997	610	2,155	213	—	1,103	5,076	177,180	1,048
1936	946	602	2,487	169	—	700	4,903	180,688	1,138
1937	491	352	2,303	178	—	741	4,064	184,666	1,292
1938	950	201	1,843	183	—	1,144	4,321	187,424	614
1939	441	184	1,777	230	—	640	3,272	190,945	719
1940	200	104	1,615	732	—	974	3,624	192,461	608
1941	214	18	152	1,649	306	480	2,819	195,583	1,147
1942	110	25	111	605	70	437	1,359	194,718	535
1943	157	92	133	100	55	217	754	193,976	347
1944	49	31	Cr. 143	75	166	34	212	192,957	140
1945	140	11	61	150	241	492	1,094	191,790	254
1946	142	208	75	473	451	276	1,625	193,852	1,008
1947	535	332	173	1,453	772	821	4,087	198,005	1,091
1948	676	1,471	316	1,388	1,097	125	5,074	200,549	309
1949	913	2,131	449	1,626	1,099	942	7,161	207,377	126
1950	4,496	4,691	804	2,002	1,357	2,859	16,209	219,100	142
1951	3,723	6,591	1,164	4,091	2,003	3,081	20,653	246,374	17
1952	15,198	6,684	2,694	4,803	2,729	3,409	35,517	276,577	647
1953	13,533	179	2,422	4,858	5,432	8,787	35,213	306,144	1,861
1954	11,295	1,406	2,328	3,939	3,144	6,276	28,388	331,565	822
1955	9,752	1,410	1,920	5,661	3,993	6,726	29,462	355,763	442
1956	6,139	2,049	1,638	5,516	4,187	7,098	26,629	377,465	245
1957	5,519	4,200	950	7,119	5,599	9,169	32,556	410,290	112
1958	4,209	2,480	1,398	7,694	5,891	6,599	28,272	436,857	147
1959	5,711	2,200	1,428	8,395	7,410	7,199	32,342	464,237	173
1960	4,953	1,553	1,373	9,547	8,723	6,355	32,504	493,575	171
1961	4,221	400	1,966	10,314	10,479	8,037	35,418	523,070	94
1962	5,432	300	2,587	10,952	12,032	6,449	37,751	555,130	222
1963	6,204	500	2,438	10,770	13,420	5,563	38,894	587,336	485
1964	7,496	—	3,028	10,537	15,630	6,409	43,100	626,045	442
1965	6,800	794	2,822	10,957	19,948	5,457	46,779	665,620	473
1966	7,628	1,434	2,583	12,667	19,908	3,580	47,800	705,514	267
1967	9,068	2,427	1,746	13,642	18,230	5,902	51,015	748,601	216
1968	7,750	4,542	2,402	14,552	18,816	5,115	53,177	792,969	408
1969	10,547	5,679	1,190	12,560	20,116	4,765	54,859	840,343	3,015
1970	6,331	4,566	2,055	13,330	24,627	8,594	59,504	886,778	182
1971	7,194	27	2,202	15,176	25,549	13,492	63,640	924,111	582
1972	5,919	3,666	1,902	18,369	23,994	32,606	86,456	975,958	1,216
1973	4,179	4,104	2,371	23,598	32,872	21,882	89,006	1,030,060	265
1974	5,569	3,467	2,505	26,708	34,324	3,291	75,863	1,074,111	4,899
1975	6,185	4,069	3,728	24,487	45,262	6,140	89,871	1,120,313	1,037

(a) From 1900, year ended 30 June. Sinking fund at 31 March from 1900 to 1928. (b) From 1928 includes expenditure from Loan Suspense Account. (c) Total amount for the years 1877 to 1881. (d) Total amount for the years 1872 to 1881. (e) Includes expenditure prior to 1890. (f) Reduction due to operation of Financial Agreement Act of 1928.

NOTE. This table has been replaced by a new series 'State and Local Authorities: Receipts and Outlay' on a later page.

NATIONAL WELFARE FUND: EXPENDITURE IN WESTERN AUSTRALIA

NOTE. The National Welfare Fund was established, with effect from 1 July 1943, in terms of the *National Welfare Fund Act* 1943. During the first two years of operation, only maternity allowances and funeral benefits were paid from the Fund. Expenditure on these items in Western Australia was \$341,014 in 1943-44 (maternity allowances \$322,710, funeral benefits \$18,304) and \$374,302 in 1944-45 (maternity allowances \$348,164, funeral benefits \$26,138). Under the provisions of the *National Welfare Fund Act* 1945, effective from 1 July 1945, expenditure on age pensions (introduced in 1909), invalid pensions (1910), widows' pensions (1942), and child endowment (1941) became a charge on the Fund. Unemployment, sickness, and special benefits came into operation on 1 July 1945. Hospital benefit was first paid in 1945-46 (in respect of public hospitals from 1 January 1946, and private hospitals from 18 February 1946).

The principal expenditures from the Fund are shown separately in the table below.

(\$'000)

Year ended 30 June	Social services			Health services							Total expenditure on health services (c)	Total expenditure from National Welfare Fund (d)
	Pensions		Child endowment (a)	Un-employment, sickness, and special benefits	Total expenditure on social services	Hospital and nursing home benefits	Medical benefits	Pharmaceutical benefits	Tuberculosis campaign (b)	Milk for school children		
	Age and invalid	Wid-ows'										
1946	3,721	405	2,570	144	7,186	248	—	—	—	—	248	7,435
1947	4,010	391	2,958	339	8,165	716	—	—	20	—	736	8,901
1948	5,131	484	2,898	203	9,150	730	—	—	2	—	732	9,883
1949	5,842	561	3,620	165	10,644	979	—	24	22	—	1,025	11,670
1950	6,176	594	4,607	306	12,215	1,000	—	69	148	—	1,244	13,477
1951	6,877	632	6,539	242	14,882	1,044	14	496	473	—	2,047	16,955
1952	8,213	733	6,956	118	16,620	1,023	151	1,004	627	134	2,970	19,625
1953	9,684	808	8,106	444	19,681	1,102	237	1,108	1,201	185	3,867	23,584
1954	10,750	870	7,766	399	20,435	1,314	590	1,396	1,214	213	4,763	25,235
1955	11,519	902	8,138	286	21,516	1,491	1,156	1,537	967	253	5,432	26,967
1956	13,363	1,062	9,368	374	24,887	1,559	1,461	1,626	1,017	273	5,958	30,845
1957	14,508	1,225	8,923	896	26,281	1,544	1,590	1,624	1,123	316	6,222	32,503
1958	16,154	1,415	9,143	1,265	28,725	1,858	1,746	2,006	1,041	305	6,983	35,708
1959	17,244	1,601	10,396	1,673	31,681	2,571	1,917	2,794	1,272	364	8,948	40,679
1960	19,833	1,827	9,720	1,504	33,652	3,351	2,241	3,178	1,163	458	10,427	44,079
1961	21,586	2,104	11,402	1,309	37,180	3,817	2,339	3,630	1,111	448	11,386	48,812
1962	24,344	2,371	10,205	1,887	39,575	3,996	2,455	4,809	873	526	12,695	52,270
1963	25,582	2,377	10,485	2,006	41,203	4,189	2,657	5,161	885	584	13,501	54,705
1964	27,373	3,115	12,994	1,978	46,223	4,705	2,808	5,242	839	615	14,238	60,460
1965	29,413	3,463	13,406	1,401	48,450	4,987	3,716	5,294	822	637	15,486	64,635
1966	30,760	3,602	13,624	872	49,648	5,286	4,345	5,870	758	619	16,906	67,316
1967	33,794	4,011	15,498	855	55,001	5,881	4,944	6,719	600	698	18,998	74,666
1968	36,418	4,346	14,845	758	57,295	6,598	5,265	7,117	862	850	20,860	78,894
1969	39,404	4,786	15,540	795	61,729	7,401	5,600	8,702	645	797	23,340	85,828
1970	44,637	5,600	17,894	1,039	70,725	9,153	6,373	9,836	828	797	27,262	98,577
1971	48,979	6,172	16,423	1,699	75,279	10,256	9,782	11,215	800	835	33,246	109,216
1972	57,374	7,180	18,188	4,298	89,623	14,492	13,800	12,418	907	997	43,032	133,770
1973	76,188	10,064	21,407	8,372	119,622	19,062	15,958	13,258	824	1,086	50,827	171,763
1974	98,011	13,409	19,009	8,314	147,040	21,222	16,478	16,153	803	596	56,535	205,778
1975	138,812	18,459	19,085	24,944	213,981 (e)	25,758	19,437	19,830	1,023	..	68,542	284,016

(a) A number of endowments are paid every twelve weeks. Although in most years there are four such payments, there are some years in which five payments are made. (b) Comprises amounts paid to individuals in the form of allowances and to the State Government as reimbursements for expenditure incurred in the provision and maintenance of facilities. (c) Excludes some relatively minor expenditure not allocable among States. In 1974-75 such costs, for Australia as a whole, amounted to \$6.63 million and comprised \$1.63 million for the supply of blood products; radio-active isotopes, \$2.44 million; hearing aids for school children and pensioners, \$1.72 million; poliomyelitis vaccine, \$0.27 million; and other vaccines, \$0.57 million. (d) See footnote (c). (e) Includes expenditure of \$857,000 covering the operating deficits of certain nursing homes.

NOTE. This table has been replaced by a new series 'Commonwealth Government Cash Benefits to or for Persons in Western Australia' on the next page.

STATE AND LOCAL AUTHORITIES: RECEIPTS AND OUTLAY

NOTE. This series replaces 'Public Revenue and Expenditure: Consolidated Revenue Fund' and 'Net Expenditure from Loan Funds: Public Debt' on earlier pages.

(\$ million)

Year ended 30 June	Receipts and financing items					Outlay					
	Taxes, fees, fines, etc.	Income from public enterprises	Property income	Grants from the Australian Government	Financing items	Total funds available	Final consumption expenditure	Gross capital formation	Transfer payments	Net advances	Total outlay
1966	52.3	14.5	9.9	146.9	99.4	323.0	104.5	156.8	54.0	7.8	323.0
1967	63.3	19.8	13.3	153.5	93.0	342.8	116.3	161.6	58.5	6.3	342.8
1968	74.6	22.7	17.8	164.8	94.0	373.9	133.4	173.5	60.4	6.6	373.9
1969	87.8	19.4	24.5	180.4	93.0	405.1	149.0	184.7	64.3	7.1	405.1
1970	103.0	24.2	32.0	203.5	115.2	477.9	176.3	220.3	72.1	9.3	477.9
1971	104.6	25.6	41.2	256.1	121.5	549.0	214.1	249.1	76.1	9.6	549.0
1972	138.3	33.8	44.6	278.6	186.8	682.2	265.7	309.7	91.1	15.7	682.2
1973	160.0	26.4	52.9	323.5	133.7	696.5	304.1	274.0	103.0	15.4	696.5
1974	195.5	24.6	63.5	394.8	129.1	807.5	381.8	306.5	111.4	7.9	807.5
1975	255.5	25.6	72.1	553.0	236.6	1,142.8	562.8	431.6	123.6	24.7	1,142.8
1976	324.8	r 45.4	70.8	772.5	146.6	r 1,360.2	r 732.7	469.4	140.2	17.8	r 1,360.2
1977	372.8	r 20.3	89.0	845.2	262.2	r 1,589.6	r 876.6	533.5	162.3	17.2	r 1,589.6
1978	425.9	r 20.0	108.6	974.1	289.7	r 1,818.5	r 1,008.0	598.5	193.2	18.8	r 1,818.5
1979	468.7	r 24.2	111.9	1,053.4	346.2	r 2,004.4	r 1,114.3	664.8	209.9	15.5	r 2,004.4
1980	522.7	r 12.9	152.7	1,165.1	r 344.5	r 2,197.8	r 1,268.2	707.6	222.4	0.4	r 2,197.8
1981	597.6	38.3	169.4	1,305.3	331.2	2,441.6	1,456.2	734.0	249.1	2.4	2,441.6

COMMONWEALTH GOVERNMENT CASH BENEFITS TO OR FOR PERSONS IN WESTERN AUSTRALIA

NOTE. This series replaces 'National Welfare Fund: Expenditure in Western Australia' on the previous page.

(\$'000)

Year ended 30 June	Health				Social security and welfare						
	Hospital and nursing home benefits	Medical and pharmaceutical benefits	Other	Total	Unemployment, Age and invalid pensions	Unemployment, sickness and special benefits	Widows' pensions	Child endowment	Other	Total	Other services
1971	10,256	18,318	865	29,439	48,979	1,698	6,172	16,423	25,895	99,167	3,563
1972	14,494	23,153	1,029	38,676	57,374	4,298	7,234	18,188	21,599	108,693	4,258
1973	19,059	25,463	1,232	45,754	76,188	8,372	10,064	21,407	25,286	141,317	6,645
1974	21,223	28,225	600	50,048	98,011	8,314	13,409	19,009	35,450	174,193	10,219
1975	25,759	33,581	847	60,187	138,812	24,944	18,459	19,084	49,986	251,285	16,378
1976	30,810	65,279	941	97,030	183,513	41,252	24,809	22,737	62,115	334,426	23,444
1977	29,446	51,570	1,004	82,020	217,185	51,142	27,700	89,514	75,419	460,960	24,261
1978	31,574	38,510	1,018	71,102	255,432	69,023	32,290	90,809	89,378	536,932	27,460
1979	30,239	54,588	1,032	85,859	284,863	92,939	36,329	88,151	98,709	600,991	28,770
1980	33,252	59,562	1,290	94,104	312,878	100,731	40,647	89,558	111,960	655,774	28,631
1981	42,533	68,678	2,214	113,425	353,663	105,366	45,925	84,338	147,683	736,975	32,231

SOCIAL SERVICE BENEFICIARIES AND REPATRIATION PENSIONS: WESTERN AUSTRALIA

Year ended 30 June	Social service benefits							Repatriation pensions				
	Pensioners (a)			Family allowance (a) (b)				Disability		Service		
	Age (c) (d)	Invalid (c) (d)	Total Age and Invalid	Widow	Under 16 years of age (e) (f)	Students (g)	Total	Un- employ- ment benefit (h)	Number (a) (i)	Amount paid \$'000	Number (a) (j)	Amount paid \$'000
1910	2,361	..	2,361						n.a.	n.a.		
1920	4,791	1,788	6,579						22,311	1,087		
1921	5,002	2,004	7,006						23,235	1,501		
1922	5,316	2,022	7,338						23,561	1,468		
1923	5,599	2,063	7,662						23,878	1,430		
1924	6,099	2,250	8,349						24,301	1,430		
1925	6,448	2,392	8,840						25,138	1,439		
1926	6,940	2,632	9,572						25,927	1,521		
1927	7,326	2,699	10,025						26,689	1,535	not applicable	
1928	7,713	2,866	10,579						27,495	1,545		
1929	8,256	3,029	11,285						28,084	1,575		
1930	8,913	3,284	12,197						28,407	1,586		
							not applicable					
1931	10,461	3,554	14,015						28,063	1,575		
1932	11,458	3,790	15,248						26,345	1,397		
1933	11,097	3,827	14,924						25,475	1,259		
1934	11,854	4,122	15,976						24,940	1,255		
1935	12,840	4,290	17,130						24,436	1,304		
1936	13,740	4,482	18,222						23,882	1,326	375	5
1937	14,453	4,634	19,087						22,886	1,361	923	47
1938	15,332	4,863	20,195						23,375	1,379	1,204	73
1939	16,278	5,116	21,394						22,617	1,394	1,454	92
1940	19,024	3,454	22,478						21,449	1,370	1,489	103
1941	19,423	3,425	22,848						20,388	1,343	1,545	112
1942	19,156	3,557	22,713		68,533	68,533			19,757	1,337	1,561	129
1943	18,575	3,580	22,155	2,596	65,777	65,777			20,245	1,506	1,454	147
1944	18,109	3,443	21,552	2,796	66,938	66,938			22,511	1,884	1,369	144
1945	17,713	3,414	21,127	2,894	68,316	68,316			27,686	2,105	1,343	144
1946	18,797	3,538	22,335	2,870	69,325	69,325	422		37,921	2,530	1,403	173
1947	21,162	4,002	25,164	2,719	71,968	71,968	1,095		42,127	2,856	1,580	192
1948	22,210	4,387	26,597	2,719	75,186	75,186	409		44,818	3,000	1,715	290
1949	23,739	4,340	28,079	2,876	79,693	79,693	126		46,785	3,516	1,832	301
1950	24,316	4,294	28,610	2,883	133,557	133,557	267		48,878	3,776	1,953	331
1951	24,317	4,184	28,501	2,789	172,186	172,186	60	51,027	4,545	2,022	369	
1952	24,782	3,964	28,746	2,676	183,257	183,257	57	52,071	5,429	2,136	449	
1953	25,679	3,996	29,675	2,686	192,991	192,991	844	52,607	5,843	2,343	556	
1954	27,248	4,101	31,349	2,753	202,098	202,098	427	53,352	6,174	2,468	605	
1955	28,833	4,191	33,024	2,848	212,025	212,025	157	54,117	6,877	2,692	723	
1956	30,244	4,425	34,669	3,015	220,792	220,792	473	54,427	6,902	3,648	964	
1957	32,192	5,039	37,231	3,243	230,922	230,922	1,940	54,987	7,169	4,306	1,095	
1958	33,124	5,519	38,643	3,542	237,732	237,732	2,330	55,251	8,017	4,672	1,395	
1959	34,629	5,941	40,570	3,833	245,090	245,090	2,852	56,008	7,893	5,009	1,552	
1960	36,575	6,152	42,727	4,039	250,449	250,449	2,512	56,644	8,471	5,344	1,751	
1961	37,656	6,945	44,601	4,348	257,037	257,037	2,154	57,123	9,310	6,101	2,102	
1962	39,104	7,826	46,930	4,570	266,067	266,067	2,932	57,947	10,177	7,115	2,687	
1963	40,661	8,170	48,831	4,486	270,736	270,736	2,674	57,580	10,527	7,526	2,927	
1964	41,819	8,306	50,125	4,734	275,910	7,865 283,775	2,677	57,047	11,564	7,754	3,177	
1965	42,706	8,615	51,321	4,926	279,642	8,844 288,486	1,679	55,920	11,447	7,780	3,320	
1966	43,876	8,575	52,451	5,071	286,534	8,769 295,303	785	54,560	12,637	7,757	3,571	
1967	45,741	8,307	54,048	5,228	295,628	10,697 306,325	718	52,967	11,889	7,674	3,612	
1968	48,850	8,310	57,160	5,482	306,492	10,999 317,491	608	51,193	11,934	7,586	3,777	
1969	50,432	8,413	58,845	5,559	318,147	11,446 329,593	524	49,526	13,061	7,298	4,071	
1970	56,017	7,933	63,950	6,086	322,058	11,539 333,597	474	47,993	12,811	7,783	4,491	
1971	58,224	8,155	66,379	6,392	333,848	13,737 347,585	872	46,514	13,140	7,767	4,769	
1972	60,523	8,485	69,008	6,795	343,455	15,452 358,907	2,808	45,079	14,413	7,864	5,298	
1973	68,701	9,518	78,219	7,948	346,769	17,821 364,590	4,960	44,093	15,462	9,599	7,394	
1974	76,124	10,406	86,530	8,763	343,404	17,585 360,989	2,863	42,807	17,363	10,669	10,191	
1975	79,831	10,961	90,792	9,442	349,702	18,924 368,626	9,317	41,747	21,845	11,814	15,149	
1976	84,087	12,265	96,352	10,027	352,998	20,151 373,149	13,598	40,619	23,118	13,472	20,560	
1977	86,470	13,263	99,733	10,691	n.a.	n.a. 376,346	15,706	39,459	25,587	15,338	26,933	
1978	94,491	13,653	108,144	11,494	n.a.	n.a. 377,545	20,470	38,053	28,728	16,975	33,785	
1979	96,558	15,045	111,603	12,232	n.a.	n.a. 371,315(k) 29,000	r 36,883	28,183	18,794	38,896		
1980	98,887	15,894	114,781	12,476	n.a.	n.a. r 375,013(k) 29,800	35,857	29,097	21,131	45,911		
1981	101,042	16,352	117,394	12,526	n.a.	n.a. 377,113	28,638	34,920	33,411	23,704	59,328	

(a) Number at 30 June. (b) Previously child and student endowment. Name of benefit, rates and conditions changed from 15 June 1976. (c) Prior to 30 June 1957 excludes pensioners in benevolent homes. (d) At 30 June 1940 invalid pensioners who qualified were reclassified as age pensioners. (e) Prior to 30 June 1957 excludes endowed children in institutions. (f) Child endowment commenced 1 July 1941 for second and subsequent children. From 20 June 1950 endowment extended to include first or only children. (g) From 14 January 1964 includes students aged 16 and under 21; extended to 25 years in 1976. (h) Average number of persons on benefit at end of each week. (i) Includes pensions paid to incapacitated veterans and to dependants of incapacitated or deceased veterans. (j) Comprises pensions paid to veterans and their dependants. (k) Estimated.

BANKING AND INSURANCE

Year	Trading banks			Savings banks (a)		Insurance			
	De- positors' balances (b)	Loans (other than loans to authorised dealers in the short- term money market), advances and bills discounted (b)	Weekly debits to customers' accounts (c)	Operative accounts at end of year	Depositors' balances at end of year	Life Sum insured under policies existing at end of year (f)	General (d) (e)		
							Ordinary (including super- annuation)	Industrial	Premiums Claims
	\$'000	\$'000	\$m		\$'000	\$'000	\$'000	\$'000	\$'000
1870	n.a.	n.a.		895	27	n.a.	n.a.		
1880	n.a.	n.a.		1,299	45	n.a.	n.a.		
1890	1,904	2,809		3,014	69	n.a.	n.a.		
1900	8,781	5,514		33,646	2,598	6,916	439		
1910	12,627	12,228		84,262	6,955	12,717	1,170		
1920	24,742	21,594		211,415	14,516	21,640	4,089	1,080	368
1931	24,455	41,635	n.a.	371,662	21,735	39,906	8,353	1,914	971
1932	28,563	39,292		206,997	20,435	39,181	8,585	1,693	655
1933	29,785	38,433		194,095	20,129	39,447	8,918	1,786	796
1934	32,853	38,742		192,915	20,798	40,631	9,394	1,746	801
1935	36,206	41,061		197,611	21,858	42,899	9,945	1,929	910
1936	38,731	43,232		208,990	23,034	45,608	10,688	2,176	1,015
1937	39,463	44,532		217,247	23,670	48,857	11,373	2,410	1,366
1938	41,230	45,141		225,118	24,075	51,653	11,944	2,461	1,526
1939	41,181	47,774		232,564	24,792	53,853	12,609	2,746	1,462
1940	42,219	47,529		233,649	23,720	54,708	13,086	2,884	1,460
1941	47,099	45,617		238,820	25,042	55,842	13,875	2,792	1,236
1942	51,918	43,638		250,153	27,642	55,881	15,311	2,806	1,245
1943	61,135	37,827		279,469	37,769	57,865	16,656	2,347	1,014
1944	71,529	33,462		301,225	51,581	61,380	17,962	2,369	897
1945	74,846	31,504		316,565	63,526	66,254	19,024	2,565	1,154
1946	(g) 66,652	(g) 33,726	(h) 11.6	340,737	76,578	77,608	21,036	2,890	1,223
1947	72,490	45,388	14.2	349,091	73,250	88,016	23,054	3,503	1,737
1948	82,032	48,754	17.4	358,709	72,365	98,891	25,139	4,188	2,089
1949	100,971	49,904	21.4	365,130	75,070	111,213	27,127	5,071	2,053
1950	116,458	55,301	27.4	378,670	79,225	126,332	29,503	6,281	2,916
1951	149,244	66,680	38.6	392,790	89,345	148,724	32,460	7,782	3,947
1952	170,923	83,353	43.6	403,678	94,342	171,007	35,257	9,950	5,877
1953	170,234	87,353	44.2	414,288	99,589	195,499	38,110	11,558	6,171
1954	181,863	106,429	50.8	422,480	105,229	221,568	40,240	12,449	6,224
1955	180,895	137,830	52.4	426,637	107,258	251,543	41,487	13,707	7,349
1956	174,070	142,156	53.9	446,419	115,868	282,139	42,114	14,723	8,199
1957	185,576	135,074	57.1	473,548	125,386	317,264	42,535	15,169	9,416
1958	186,478	141,198	60.4	497,690	131,896	352,360	43,003	17,064	9,416
1959	180,300	147,106	61.5	527,079	142,998	396,322	43,279	18,679	10,899
1960	192,076	142,064	69.7	550,966	157,246	459,740	44,325	21,569	12,771
1961	190,094	146,244	75.7	577,619	161,424	523,636	44,745	23,583	15,022
1962	209,274	139,204	80.4	625,070	181,056	597,892	46,754	25,133	15,113
1963	219,952	153,528	88.2	683,417	208,812	679,161	47,983	27,319	18,262
1964	242,268	164,878	96.4	736,009	239,766	774,550	50,588	30,336	20,234
1965	272,430	186,000	106.3	786,340	261,654	881,652	53,565	33,347	21,429
1966	310,432	195,190	122.4	848,562	292,871	1,005,119	57,916	37,565	23,360
1967	355,899	212,023	138.6	905,349	330,807	1,164,613	63,960	43,330	27,131
1968	398,837	252,627	169.1	970,120	373,602	1,383,330	69,961	48,310	31,160
1969	462,559	280,147	209.0	1,036,180	412,984	1,651,918	75,605	56,863	37,748
1970	558,017	323,824	246.4	1,096,466	431,877	1,948,690	83,255	68,211	41,178
1971	544,732	351,110	295.3	1,153,420	464,611	2,307,828	91,293	78,995	47,286
1972	552,546	357,410	318.4	1,205,448	511,457	2,670,637	95,137	87,187	53,112
1973	693,456	443,330	355.9	1,250,576	608,133	3,137,437	101,495	90,465	58,389
1974	829,002	604,460	439.4	1,327,699	684,974	3,660,469	105,055	107,043	75,094
1975	906,589	673,526	515.9	1,401,485	779,427	4,344,464	108,739	133,931	119,590
1976	1,092,350	791,376	680.0	1,443,883	897,693	5,079,654	113,938	167,499	123,779
1977	1,376,813	927,709	814.4	1,466,200	960,548	5,854,286	115,468	210,531	144,076
1978	1,448,206	1,163,207	975.9	1,511,092	1,048,510	7,142,800		238,042	187,576
1979	1,621,852	1,368,657	1,151.8	1,539,416	1,133,627	7,775,500		r 254,887	r 200,345
1980	1,742,801	1,678,121	1,432.3	1,579,722	1,216,182	8,309,800		r 270,779	r 214,571
1981	2,026,087	1,942,691	1,826.3	1,647,837	1,360,315	n.y.a.		308,378	284,569
1982	2,518,977	2,287,053	2,276.4	1,741,114	1,514,207	n.y.a.		n.y.a.	n.y.a.

(a) From 1900, year ended 30 June. (b) Average based on amounts as at close of business each week. From 1927, year ended 30 June. (c) Weekly average for year ended 30 June. Excludes debits to Commonwealth Government accounts at city branches. From 1946-47 includes The Rural and Industries Bank of Western Australia (Rural Department). (d) From 1927, year ended 30 June. (e) Includes transactions of the Motor Vehicle Insurance Trust, which became the sole insurer in respect of motor vehicle (third party) insurance from 1 July 1949. (f) Actual date varies according to the financial year of individual insurance companies. From 1978 this dissection not available. (g) Average for nine months to 30 June. (h) Ten months ended June 1946.

TRANSPORT: CUSTOMS AND EXCISE

Year	State Government railways (a)				Private railways	Customs and excise revenue (b)			Shipping (b) (c)	
	Route kilometres at end of year (d)	Operating revenue (e)	Operating expenses (e)	Paying goods and livestock carried (e)	Route kilometres at end of year (b) (f)	Customs	Excise	Total	Clearances to ports outside the State	Net tons
		\$'000	\$'000	'000 tonnes		\$'000	\$'000	\$'000	Number	
1870	—	—	—	—	—	81	—	81	131	'000
1880	55	5	8	2	61	186	—	186	168	68
1890	303	90	103	62	620	356	—	356	267	126
1900	2,181	2,519	1,723	1,406	1,003	1,889	63	1,952	747	420
1910	3,452	3,275	2,194	2,278	1,452	1,543	213	1,756	726	1,606
1920	5,695	4,584	4,001	2,656	1,477	1,311	799	2,110	729	2,372
1930	6,616	7,318	6,226	3,587	1,363	3,882	1,527	5,409	794	2,659
1931	6,729	6,398	5,222	3,204	1,329	2,166	1,304	3,470	742	3,932
1932	6,816	5,845	4,247	2,893	1,336	2,117	1,327	3,444	694	3,686
1933	6,981	5,864	4,223	2,886	1,360	2,430	1,719	4,149	691	3,530
1934	7,017	5,839	4,373	2,695	1,374	2,574	1,628	4,202	683	3,564
1935	7,015	6,624	4,765	2,950	1,399	2,766	1,736	4,502	730	3,568
1936	7,014	6,892	4,976	2,933	1,416	3,239	1,830	5,069	725	3,775
1937	7,012	6,924	5,240	2,843	1,405	3,504	1,926	5,430	761	3,831
1938	7,042	7,356	5,420	3,111	1,374	3,710	1,955	5,665	866	3,754
1939	7,046	7,198	5,823	2,905	1,358	3,381	2,218	5,599	930	4,111
1940	7,051	7,112	5,657	2,702	1,337	3,769	2,395	6,164	805	4,327
1941	7,051	7,144	5,516	2,646	1,312	2,934	3,149	6,083	556	3,751
1942	7,051	7,993	6,052	2,681	1,316	2,273	3,757	6,030	492	3,087
1943	7,051	8,836	6,895	2,545	1,366	1,646	5,569	7,215	312	2,508
1944	7,051	8,773	7,592	2,601	1,334	1,661	6,225	7,886	385	1,467
1945	7,051	8,552	7,529	2,951	1,284	1,783	5,705	7,488	382	1,580
1946	7,051	8,213	8,053	2,771	1,136	2,707	6,508	9,215	490	1,528
1947	6,997	8,092	8,848	2,618	1,221	4,377	6,894	11,271	572	2,473
1948	6,997	9,198	11,140	2,903	1,189	5,784	9,264	15,048	752	2,646
1949	6,954	10,430	13,405	2,781	1,181	6,987	10,254	17,241	950	3,431
1950	6,843	12,944	15,003	2,889	1,246	10,166	10,943	21,109	1,006	4,678
1951	6,804	14,392	17,238	3,082	1,210	10,839	11,973	22,812	1,060	5,272
1952	6,619	18,327	21,331	3,112	1,210	14,045	16,312	30,357	1,045	5,552
1953	6,611	15,945	24,175	2,661	1,165	9,908	18,395	28,303	1,025	5,524
1954	6,616	22,749	27,512	3,257	1,220	12,241	19,447	31,688	1,005	5,407
1955	6,616	25,061	27,871	3,461	1,204	12,196	21,812	34,008	1,136	5,320
1956	6,629	26,548	29,986	3,854	1,168	8,473	24,092	32,565	1,268	6,144
1957	6,626	28,088	32,023	4,291	1,136	5,504	30,078	35,582	1,244	6,776
1958	6,626	25,950	29,685	3,647	925	5,476	32,547	38,023	1,219	6,531
1959	6,626	27,400	29,865	3,976	925	4,800	32,398	37,198	1,282	6,499
1960	6,630	30,077	30,816	4,605	832	5,614	33,634	39,248	1,403	6,607
1961	6,635	33,076	31,103	4,911	755	7,470	33,835	41,305	1,598	7,234
1962	(g) 6,198	35,608	31,527	5,428	(h) 898	7,156	35,705	42,861	1,687	8,547
1963	(g) 6,111	33,429	31,150	4,870	888	8,996	35,944	44,940	1,687	8,962
1964	(g) 5,918	35,190	32,250	5,271	665	10,369	37,839	48,208	1,528	8,252
1965	6,008	36,686	32,920	5,313	(i) 34	10,692	43,349	54,041	1,580	8,627
1966	6,030	43,669	35,985	6,486	(j) 460	15,251	53,536	68,787	1,560	8,593
1967	6,140	49,120	40,170	7,999	455	13,569	58,176	71,745	1,711	9,528
1968	6,140	52,773	42,623	9,053	455	19,468	62,903	82,371	1,690	10,977
1969	6,157	50,558	44,503	9,078	(k) 882	21,202	69,289	90,490	1,770	12,916
1970	6,161	57,240	48,550	10,837	884	24,649	76,637	101,286	1,848	15,372
1971	6,175	61,917	53,205	13,457	884	32,262	88,978	121,240	2,165	21,005
1972	6,116	64,846	57,112	13,867	884	30,072	101,883	131,955	2,499	27,765
1973	6,168	64,793	61,011	13,706	(l) 1,220	25,714	106,054	131,768	2,425	28,734
1974	6,192	79,861	74,403	15,059	1,222	30,612	138,197	168,809	2,481	34,291
1975	6,075	108,309	96,406	16,348	(m) 1,181	44,114	148,310	192,424	2,655	40,122
1976	6,163	132,312	110,893	17,812	1,179	46,767	183,838	230,605	2,739	45,361
1977	6,165	138,311	123,382	19,003	1,155	63,037	203,852	266,889	2,613	42,040
1978	5,764	150,588	140,426	18,625	1,155	68,118	216,929	285,047	2,562	43,067
1979	5,764	155,966	152,627	19,288	1,155	71,704	256,486	328,190	2,547	42,010
1980	5,773	175,735	172,979	21,388	1,159	83,620	260,299	343,919	2,679	43,974
1981	5,773	182,373	186,156	20,271	1,160	n.y.a.	n.y.a.	n.y.a.	2,122	n.a.
1982	5,773	213,566	209,552	19,776	n.y.a.	110,939	283,499	394,438	1,903	n.a.

(a) From 1900, year ended 30 June. (b) From 1915, year ended 30 June. (c) From 1967 excludes vessels of 200 net tons and under. For 1979, figures relate to movements overseas direct or via other Australian ports. From 1980, figures relate to overseas direct movements only. (d) Open for general and passenger traffic. (e) From 1942 includes operations of Railway Road Services, which began in November 1941. (f) From 1900 to 1964 includes 446 kilometres of line open for general and passenger traffic. (g) Decrease due to proclamations of closure issued by authority of the *Railways (Cue-Big Bell and other Railways) Discontinuance Act 1960*. (h) Increase due to the transfer of all government-operated timber railways to private control. (i) Decrease due to transfer of Midland Railway Company to Western Australian Government Railways and to closure of timber and mining railways. (j) Increase due to opening of Goldsworthy-Port Hedland, Tom Price-Dampier and Westmine-Tilley iron ore railways. (k) Increase due to opening of Newman-Port Hedland iron ore railway. (l) Increase due to opening of Pannawonica-Cape Lambert iron ore railway and extensions to Goldsworthy and Tom Price railways. (m) Decrease due to closure of Westmine-Tilley iron ore railway and timber railways.

MOTOR VEHICLE REGISTRATIONS: EXPORTS OF WHEAT

Year	New motor vehicles registered (a)				Motor vehicles on register (b)				Wheat exports (c)	
	Motor cars (d)	Utilities, panel vans, trucks and omnibuses	Motor cycles (e)	Total	Motor cars (f)	Utilities, panel vans, trucks and omnibuses	Motor cycles (e)	Total	Quantity (tonnes)	Value (\$'000)
1860									1	—
1870									—	—
1880					n.a.				408	8
1890									—	—
1900						n.a.			27	—
1910							n.a.		54.839	813
1920					3.404			n.a.	249.049	5.083
1926					20.011				358.565	8.373
1927					19.451	5.819			444.430	9.334
1928	n.a.	n.a.	n.a.	n.a.	24.205	8.104			712.884	13.989
1929					27.174	9.767			710.081	13.384
1930					31.130	11.358	7.707	50.195	679.109	12.258
1931					27.741	10.880	6.777	45.398	1,155.028	10.577
1932					28.608	12.094	6.700	47.402	1,003.383	10.647
1933					27.969	12.626	6.700	47.295	835.381	9.323
1934					28.761	13.937	6.284	48.982	635.755	6.834
1935					30.578	15.530	6.597	52.705	678.647	7.844
1936					32.329	17.362	6.861	56.552	405.430	5.607
1937					34.180	19.919	6.977	61.076	375.030	7.255
1938					36.386	22.596	7.079	66.061	599.776	9.667
1939	3.297	1.814	568	5.679	38.039	24.441	7.199	69.679	615.452	6.055
1940	2.871	1.517	399	4.787	38.907	25.026	6.789	70.722	417.214	4.669
1941	1.015	632	200	1.847	36.995	24.788	6.704	68.487	404.314	5.858
1942	250	353	74	677	29.022	21.625	4.057	54.704	266.005	4.021
1943	218	151	57	426	29.750	21.189	3.935	54.874	139.833	2.111
1944	19	1,102	109	1,230	30.295	22.459	4.324	57.078	328.138	5.813
1945	40	597	192	829	30.635	23.943	4.501	59.079	642.015	14.955
1946	101	456	271	828	31.408	28.904	6.799	67.111	367.682	11.696
1947	1,354	1,126	678	3,158	32.879	32.097	8.199	73.175	185.102	8.964
1948	2,963	1,975	1,059	5,997	35.596	35.285	8.877	79.758	525.857	33.809
1949	4,684	3,122	1,769	9,575	40.119	38.901	10.974	89.994	500.793	28.100
1950	8,926	4,707	2,346	15,979	48.632	43.206	12.897	104.735	585.406	33.384
1951	8,201	6,610	2,802	17,613	56.235	47.908	14.535	118.678	830.346	51.688
1952	8,836	5,750	2,740	17,326	64.277	52.627	16.047	132.951	730.002	45.728
1953	6,879	4,881	1,416	13,176	69.917	56.445	15.565	141.927	634.639	40.347
1954	9,926	5,601	1,258	16,785	78.312	60.362	15.243	153.917	185.066	11.272
1955	12,394	5,993	1,202	19,589	90.255	63.870	14.662	168.787	526.212	27.478
1956	10,100	5,203	1,089	16,392	99.206	62.809	12.959	174.974	619.779	28.860
1957	9,321	4,418	1,192	14,931	104.506	63.315	12.731	180.552	1,273.578	61.291
1958	10,140	5,562	1,702	17,404	111.825	63.598	12.631	188.054	725.131	40.861
1959	10,389	5,140	2,071	17,600	119.957	65.588	12.814	198.359	639.647	33.113
1960	13,492	5,695	1,949	21,136	130.476	68.702	12.876	212.054	999.164	49.442
1961	15,161	5,542	1,080	21,783	141.612	70.974	12.589	225.175	1,428.272	71.280
1962	17,082	5,833	902	23,817	155.447	74.224	12.390	242.061	2,010.766	104.356
1963	23,175	6,367	754	30,296	169.800	75.500	11.500	256.800	1,380.372	72.197
1964	24,958	7,013	628	32,599	186.200	77.700	10.200	274.100	1,497.453	77.881
1965	23,304	6,897	553	30,754	197.800	78.500	8.900	285.200	1,102.420	56.955
1966	23,418	9,170	706	33,294	212.600	83.300	8.400	304.300	1,887.996	96.515
1967	27,922	9,404	1,158	38,484	231.200	86.300	8.400	325.900	2,312.777	126.918
1968	33,368	10,448	1,525	45,341	252.300	90.800	8.900	352.000	2,373.195	121.764
1969	35,379	11,018	1,539	47,936	275.300	94.500	9.600	379.400	1,521.376	77.987
1970	37,764	11,138	1,945	50,847	301.000	99.900	10.800	411.700	1,814.787	8.593
1971	37,769	10,872	2,718	51,359	328.500	104.900	12.200	445.600	2,670.890	130.564
1972	37,274	9,819	3,985	51,078	346.300	104.600	14.200	465.100	2,587.504	128.132
1973	36,904	11,425	4,914	53,243	364.400	107.400	16.800	488.600	2,249.934	111.744
1974	40,302	12,241	7,062	59,605	389.300	112.700	21.000	523.000	2,139.973	211.333
1975	41,474	13,693	6,613	61,780	414.800	125.000	24.600	564.400	3,241.895	409.758
1976	40,338	15,863	5,731	61,932	437.200	140.000	27.600	604.800	3,215.792	375.897
1977	44,363	17,362	3,887	65,612	473.731	153.174	28.022	654.927	3,009.101	316.258
1978	40,990	16,538	3,339	60,867	500.365	167.107	28.051	695.523	3,795.969	351.190
1979	40,882	14,025	2,713	57,620	518.705	174.064	26.916	719.685	2,208.985	257.414
1980	40,232	13,716	4,600	58,548	535.613	179.844	29.531	744.988	4,205.774	615.944
1981	41,660	15,223	6,088	62,971	552.552	187.599	33.009	773.160	2,634.951	422.443
1982	42,329	16,079	5,835	64,243	n.y.a.	n.y.a.	n.y.a.	n.y.a.	n.y.a.	n.y.a.

(a) Year ended 30 June. (b) From 1929, at 30 June; for earlier years, at various dates. For years before 1946, excludes Commonwealth Government-owned vehicles; from 1946, includes Commonwealth Government-owned vehicles other than those of defence services. From 1956 to 1976, series based on the results of the periodic census of motor vehicles. (c) From 1920, year ended 30 June; from 1978, excludes interstate exports. (d) From 1959, includes station wagons previously included with commercial vehicles. (e) Including motor scooters. (f) From June 1956, includes station wagons previously included with commercial vehicles.

EXPORTS OF CERTAIN COMMODITIES (a)

Year (b)	Wool				Meats — Fresh, chilled or frozen					
	Greasy (c)		Degreased		Beef and veal		Mutton and lamb		Pigmeat	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000
1840	23	5	—	—	—	—	—	—	—	—
1850	141	31	—	—	—	—	—	—	—	—
1860	298	99	—	—	—	—	—	—	—	—
1870	811	179	(d)	(d)	—	—	—	—	—	—
1880	1,970	543	—	—	—	—	—	—	—	—
1890	3,161	523	—	—	—	—	—	—	—	—
1900	3,927	505	198	36	(e)	(e)	(e)	(e)	(e)	(e)
1910	11,692	1,894	191	40	—	—	—	—	—	—
1920	25,530	7,218	1,504	657	300	33	—	—	—	—
1921	19,073	4,593	492	183	2,614	248	54	7	20	5
1922	24,726	5,673	1,896	731	1,124	79	—	—	—	—
1923	17,815	5,986	1,202	479	4,516	305	393	55	—	—
1924	19,214	8,028	688	446	4,829	272	202	26	—	—
1925	15,296	7,030	586	443	3,223	198	—	—	—	—
1926	21,783	6,703	756	353	3,683	240	—	—	—	—
1927	23,646	6,694	752	342	3,038	198	—	—	—	—
1928	27,398	9,734	381	192	5,001	272	103	15	—	—
1929	25,493	7,615	382	207	4,224	226	—	—	—	—
1930	28,022	5,422	465	136	5,162	272	—	—	—	—
1931	31,478	4,652	629	121	5,132	244	388	35	95	7
1932	29,298	4,540	892	151	5,098	235	958	103	554	53
1933	30,931	4,871	1,222	236	6,534	276	174	15	430	37
1934	31,751	9,131	1,237	491	5,716	234	613	49	303	29
1935	36,537	6,479	1,565	348	5,476	233	2,258	236	542	55
1936	35,602	8,892	1,398	451	7,727	321	2,521	282	703	65
1937	26,455	7,854	1,110	475	5,092	249	2,066	247	592	67
1938	24,245	5,877	1,227	446	5,191	314	3,949	470	373	52
1939	31,030	6,072	1,636	469	7,485	497	5,341	638	580	80
1940	29,610	7,603	1,655	661	4,826	329	4,665	533	2,263	324
1941	9,064	2,601	1,270	518	5,583	407	4,396	496	6,015	851
1942	34,355	9,836	2,235	1,030	3,576	327	3,684	435	4,670	682
1943	12,934	4,163	1,239	594	—	—	3,985	458	1,053	155
1944	31,145	10,842	2,095	917	1,445	190	6,664	763	1,568	238
1945	23,613	8,082	2,216	1,025	1,202	168	4,002	410	1,697	254
1946	49,070	17,136	5,328	2,778	4,317	558	2,269	275	3,401	545
1947	34,104	15,561	7,918	4,960	6,358	691	4,081	409	1,306	248
1948	36,380	27,801	7,291	5,443	6,353	604	5,079	584	303	53
1949	38,972	36,717	6,163	6,352	8,056	840	4,607	608	624	179
1950	37,832	40,071	7,934	10,852	8,625	1,183	2,392	485	163	59
1951	36,619	96,493	5,014	16,066	7,699	1,221	939	217	279	113
1952	41,483	57,291	5,150	10,389	6,028	1,135	1,044	301	424	232
1953	45,772	67,759	5,717	11,363	5,016	1,437	6,589	1,463	463	303
1954	45,677	71,346	5,406	10,914	6,148	1,748	3,309	875	215	152
1955	43,796	59,296	6,015	11,267	6,776	2,038	3,225	1,328	1,049	532
1956	51,387	57,894	7,595	12,419	7,601	2,343	6,602	2,156	743	482
1957	49,252	71,251	8,503	16,259	4,127	1,221	5,788	1,741	733	588
1958	43,750	57,224	8,417	15,462	11,025	3,302	5,083	1,900	2,324	1,462
1959	50,408	46,313	9,872	12,224	10,535	4,342	9,944	3,177	1,983	1,178
1960	50,396	58,137	12,442	19,820	13,597	6,742	8,735	2,378	1,188	953
1961	59,830	59,290	11,851	15,552	12,413	6,141	11,367	3,901	1,894	1,501
1962	62,094	68,177	11,490	15,688	12,544	6,299	8,468	2,436	3,151	2,025
1963	59,617	66,401	11,441	15,706	17,268	9,382	7,428	2,401	2,061	1,404
1964	72,240	97,138	10,388	17,101	20,528	11,497	5,385	1,895	861	718
1965	68,861	83,030	10,245	15,264	19,360	11,730	5,040	1,981	571	516
1966	87,853	101,905	9,845	13,223	18,115	12,108	10,319	4,357	420	376
1967	97,098	114,052	9,788	12,943	16,912	11,987	9,652	3,723	565	470
1968	113,224	113,868	11,484	12,549	16,821	12,995	13,153	4,745	547	474
1969	132,034	142,065	12,354	15,885	20,210	16,939	21,523	7,218	642	564
1970	120,224	117,952	12,554	17,024	23,645	21,508	29,661	11,271	1,437	1,175
1971	119,137	89,752	9,251	8,537	20,257	17,626	24,244	9,396	1,126	895
1972	145,803	109,263	13,481	11,197	24,435	22,528	42,994	17,645	2,503	1,995
1973	136,110	204,455	10,346	16,264	33,325	36,614	39,853	26,103	7,630	6,382
1974	112,536	242,357	8,577	20,973	34,778	43,039	27,189	23,682	5,939	5,772
1975	102,621	148,153	11,448	19,478	31,083	25,993	33,240	22,107	2,283	3,037
1976	140,581	207,528	12,667	23,773	35,732	32,693	52,120	34,009	2,451	3,696
1977	154,779	291,142	14,895	40,022	53,051	53,291	60,373	48,913	1,292	1,968
1978	112,075	219,402	10,996	31,919	57,827	64,896	42,532	40,885	620	984
1979	136,136	282,985	14,049	43,481	51,932	90,216	26,250	31,059	382	693
1980	124,746	316,614	16,516	61,943	41,372	93,547	44,699	51,230	204	460
1981	115,542	311,973	19,987	86,078	40,672	87,669	44,142	57,515	144	334

(a) From 1980 figures relate to overseas exports only. (b) From 1920, year ended 30 June. (c) For 1890 and earlier years includes degreased wool for which figures are not available separately. (d) See note (c). (e) Separate particulars not available. Total exports of fresh meats were 84 tonnes valued at \$9,164.

EXPORTS OF CERTAIN COMMODITIES (a)

Year (b)	Flour (c)		Butter		Potatoes		Fresh fruit (d)	Cattle	Sheep
	Quantity	Value	Quantity	Value	Quantity	Value	Value	Value	Value
	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000	\$'000	\$'000	\$'000
1860	11	—	—	—	71	1	—	—	4
1870	—	—	—	—	26	—	—	—	—
1880	n.a.	2	—	—	—	—	—	—	—
1890	—	—	—	—	—	—	—	1	2
1900	47	1	4	1	113	1	1	—	2
1910	2,559	49	77	12	18	—	11	16	9
1920	117,254	5,045	38	17	1,637	54	300	73	28
1926	83,333	2,581	—	—	1,647	43	464	30	31
1927	85,294	2,314	1	—	1,540	44	669	32	50
1928	77,208	2,009	1	—	436	12	384	70	58
1929	72,265	1,780	36	14	1,327	32	1,067	38	52
1930	62,659	1,540	21	7	5,037	151	312	1	46
1931	77,713	1,266	20	5	4,897	47	604	3	25
1932	80,061	1,156	663	179	724	14	861	3	28
1933	78,159	1,105	1,042	280	487	5	665	1	35
1934	58,599	781	1,000	195	1,708	17	673	—	26
1935	77,986	1,127	1,042	148	2,375	49	826	1	44
1936	60,633	972	1,033	246	8,440	121	905	1	47
1937	78,150	1,662	738	183	7,107	119	670	1	56
1938	73,629	1,605	1,642	472	5,030	55	549	—	74
1939	80,766	1,165	1,875	462	14,961	282	1,175	1	73
1940	83,159	1,301	1,873	490	11,953	214	740	—	65
1941	107,588	2,185	1,748	460	18,501	373	282	2	112
1942	77,087	1,681	1,676	428	10,452	213	114	1	97
1943	70,412	1,581	169	47	6,410	139	139	1	—
1944	96,941	2,344	919	262	772	22	96	27	—
1945	92,438	2,505	964	369	17,939	581	132	2	1
1946	106,088	4,667	1,283	502	13,219	446	488	2	91
1947	117,661	7,628	920	383	12,939	484	1,445	27	362
1948	127,002	11,326	2,043	1,000	18,623	681	1,688	10	347
1949	119,025	10,516	2,075	1,047	13,723	431	1,452	11	374
1950	105,065	8,335	1,475	864	10,090	384	1,780	5	426
1951	144,914	11,774	498	312	11,181	506	2,295	9	616
1952	146,584	13,669	144	93	13,514	733	2,853	23	631
1953	159,883	15,090	155	126	12,860	750	4,556	23	501
1954	134,126	11,704	170	141	16,026	1,300	3,300	29	568
1955	109,172	7,219	168	142	9,020	512	3,845	68	612
1956	117,409	7,766	255	206	2,275	171	3,393	177	625
1957	115,658	7,474	177	156	7,278	736	4,598	243	923
1958	101,448	6,907	200	169	13,998	832	3,725	308	841
1959	94,854	6,337	178	166	8,577	368	3,609	396	764
1960	79,697	5,100	191	183	9,612	436	2,437	325	845
1961	122,839	7,840	303	247	7,821	437	4,636	318	881
1962	88,889	5,891	756	532	10,328	632	2,818	55	1,254
1963	67,652	4,645	247	228	18,032	810	4,982	160	1,495
1964	62,677	4,396	138	126	9,925	353	4,016	331	1,433
1965	83,826	5,926	166	159	12,935	841	5,165	427	1,376
1966	49,130	3,378	1,062	732	21,362	1,393	4,838	283	1,633
1967	34,804	2,507	192	201	17,478	692	5,704	381	1,771
1968	41,918	2,944	225	232	13,142	622	4,068	1,229	2,191
1969	35,100	2,433	231	254	21,944	1,149	6,552	972	2,943
1970	31,173	2,257	216	243	19,888	831	6,054	760	2,876
1971	26,670	1,958	266	325	9,390	510	7,208	1,159	2,710
1972	18,882	1,345	234	297	8,600	371	5,245	1,865	3,871
1973	9,798	859	237	311	(e) 4,911	(e) 334	6,135	1,661	7,959
1974	11,232	1,380	228	278	(f) 9,576	(f) 1,113	5,835	2,111	12,539
1975	19,281	3,439	190	281	8,527	1,217	7,547	1,498	12,862
1976	11,658	2,022	224	345	12,196	1,636	6,047	1,464	14,436
1977	11,355	2,051	180	310	7,190	1,127	5,285	2,533	(g) 34,905
1978	8,291	1,481	164	245	5,853	390	5,976	3,071	35,985
1979	7,872	1,660	134	225	2,735	373	8,703	3,182	45,915
1980	(h) 4,342	(h) 1,055	(h) 38	(h) 63	(h) 5,292	(h) 616	(h) r 10,314	1,748	91,763
1981	4,952	1,279	1	5	3,824	585	9,506	2,899	100,340

(a) From 1981 figures relate to overseas exports only. (b) From 1920, year ended 30 June. (c) From 1973, figures include meal and flour of wheat or maslin; from 1978, figures include meal and flour of all cereal grains. (d) Includes tomatoes for 1933 and earlier years. (e) Some interstate details for 1973 included in 1974. (f) See footnote (e). (g) Excludes interstate exports. Details are not available for publication. (h) Figures represent overseas exports only.

EXPORTS OF CERTAIN COMMODITIES (a)

Year (b)	Skins and hides	Timber (c)	Rock lobster tails (d)			Pearl-shell (e)		Iron and steel (f)
	Value	Quantity	Value	Quantity	Value	Quantity	Value	Value
	\$'000	'000 cu m	\$'000	tonnes	\$'000	tonnes	\$'000	\$'000
1850	1	—	2	—	—	—	—	—
1860	—	2	10	—	—	—	—	—
1870	—	6	35	—	—	75	19	—
1880	8	19	133	—	—	731	79	—
1890	49	33	164	—	—	1,257	173	—
1900	150	162	916	—	—	749	173	7
1910	482	342	1,945	—	—	1,488	492	5
1920	1,246	143	931	—	—	1,702	671	16
1921	759	278	2,274	—	—	1,171	470	26
1922	730	235	2,082	—	—	1,546	508	16
1923	1,092	224	1,995	—	—	1,294	429	18
1924	1,040	315	2,735	—	—	1,447	487	6
1925	955	335	2,956	—	—	1,182	469	13
1926	883	340	3,046	—	—	1,309	465	9
1927	752	371	3,316	—	—	1,245	425	10
1928	1,106	294	2,531	—	—	969	332	7
1929	1,101	216	1,921	—	—	1,093	345	3
1930	738	186	1,615	—	—	984	331	3
1931	539	117	1,015	—	—	1,032	334	2
1932	395	87	722	—	—	622	194	1
1933	480	63	523	—	—	1,049	294	1
1934	771	115	972	—	—	856	196	7
1935	640	151	1,270	—	—	987	189	3
1936	1,061	159	1,356	—	—	984	214	3
1937	1,143	161	1,397	—	—	928	247	7
1938	985	214	1,860	—	—	1,259	336	12
1939	736	162	1,436	—	—	1,149	212	15
1940	745	143	1,251	—	—	856	153	31
1941	580	172	1,546	—	—	696	153	35
1942	772	148	1,369	—	—	590	142	19
1943	348	100	1,189	—	—	6	1	5
1944	680	103	1,216	—	—	2	1	23
1945	537	81	1,131	—	—	—	—	100
1946	1,274	96	1,429	—	—	13	8	9
1947	2,131	98	1,719	—	—	127	120	99
1948	2,048	102	2,230	—	—	342	340	89
1949	2,134	91	1,986	n.a.	(g) 500	415	367	59
1950	2,329	81	1,949	518	463	355	248	95
1951	5,294	66	1,783	1,436	1,517	345	274	83
1952	3,194	68	2,075	1,311	1,861	417	406	58
1953	3,942	112	4,147	1,329	2,085	535	612	357
1954	3,295	109	4,480	1,461	2,342	623	708	279
1955	2,921	99	3,847	1,532	2,490	700	820	602
1956	3,274	129	5,598	1,601	3,022	811	999	530
1957	4,650	132	6,215	1,618	3,514	1,101	1,391	1,174
1958	3,898	158	7,496	2,136	3,965	1,147	1,381	2,470
1959	3,489	183	8,415	2,715	5,281	789	772	4,218
1960	4,767	174	7,760	2,996	6,499	637	707	11,198
1961	3,828	157	7,175	2,316	5,881	573	502	12,781
1962	4,580	161	7,528	3,607	9,778	453	320	13,826
1963	4,339	155	7,241	3,490	8,910	388	289	15,107
1964	4,966	149	6,813	3,416	9,211	168	112	15,029
1965	4,177	133	6,279	2,672	10,592	162	133	17,933
1966	5,447	69	3,687	3,193	13,821	155	123	14,458
1967	5,377	139	7,475	3,643	13,873	218	189	15,658
1968	4,699	85	4,947	3,919	17,989	212	147	11,442
1969	6,013	88	5,068	3,038	17,133	212	125	27,002
1970	7,968	96	5,666	2,976	15,695	255	173	34,306
1971	5,395	79	4,808	3,155	19,413	196	132	34,571
1972	5,356	101	6,440	3,425	24,626	202	123	36,415
1973	13,945	113	7,087	3,171	20,919	218	131	36,529
1974	13,536	100	7,407	2,656	18,511	145	105	60,811
1975	11,195	109	9,252	3,328	25,258	170	137	71,493
1976	13,728	94	9,823	3,128	27,777	163	123	60,765
1977	24,708	78	10,152	4,071	47,061	137	90	74,508
1978	21,147	59	8,885	3,902	48,043	172	182	50,285
1979	29,280	66	10,508	4,170	51,064	103	123	72,591
1980	(h) 34,716	72	12,226	3,626	50,448	307	811	83,447
1981	17,467	32	7,050	2,858	42,480	305	928	24,423

(a) From 1981 figures relate to overseas exports only. (b) From 1920, year ended 30 June. (c) Excludes plywood and veneers and small quantities of timber for which details are not recorded. For the years 1910 to 1921, figures are approximate. (d) For years 1950 to 1952, overseas exports only. For 1953 to 1960 includes small interstate consignments of cooked whole rock lobsters. (e) From 1973, overseas exports only. (f) Principally pig-iron, cast iron and basic shapes and sections of iron and steel. (g) Estimated. (h) Figures represent overseas exports only.

EXPORTS OF CERTAIN COMMODITIES (a)

	Gold mint bullion (c)		Lead and zinc ores (d) (e)	Tin ore and concentrates	Asbestos (crude and fibre)	Manganese ore and concentrates	Iron ore and concentrates	Ilmenite concentrates (including leucoxene) (f)				
Year (b)	Quantity	Value (g)	Value	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	kg	\$'000	\$'000	\$'000	tonnes	\$'000	'000 tonnes	\$'000	'000 tonnes	\$'000	'000 tonnes	\$'000
1850	—	—	—	—	—	—	—	—	—	—	—	—
1860	—	—	2	—	—	—	—	—	—	—	—	—
1870	—	—	29	—	—	—	—	—	—	—	—	—
1880	—	—	31	—	—	—	—	—	—	—	—	—
1890	715	173	4	11	—	—	—	—	—	—	—	—
1900	31,103	7,589	—	76	—	—	—	—	—	—	—	—
1910	10,389	2,835	4	93	—	—	—	—	—	—	—	—
1920	1,275	452	102	129	—	—	—	—	—	—	—	—
1930	4	1	19	29	—	—	—	—	—	—	—	—
1936	23,981	13,385	—	18	—	—	—	—	—	—	—	—
1937	28,273	15,819	—	16	—	—	—	—	—	—	—	—
1938	33,436	18,598	1	20	281	37	—	—	—	—	—	—
1939	36,360	21,240	1	11	272	26	—	—	—	—	—	—
1940	36,329	24,056	2	14	188	17	—	—	—	—	—	—
1941	37,386	25,096	2	12	148	15	—	—	—	—	—	—
1942	30,326	20,590	2	6	74	7	—	—	—	—	—	—
1943	23,514	15,744	1	5	89	8	—	—	—	—	—	—
1944	10,855	7,250	1	6	92	8	—	—	—	—	—	—
1945	—	—	—	5	386	36	—	—	—	—	—	—
1946	—	—	—	8	1,081	104	—	—	—	—	—	—
1947	—	—	5	12	637	65	—	—	—	—	—	—
1948	11,073	7,656	146	17	1,201	148	—	—	—	—	—	—
1949	—	—	235	31	1,178	179	2	22	—	—	—	—
1950	2	2	272	49	894	204	10	126	—	—	—	—
1951	—	—	263	62	1,568	378	11	154	—	—	—	—
1952	12,286	13,143	1,369	107	2,620	709	8	115	53	102	—	—
1953	23,608	24,798	1,681	153	3,006	990	14	256	553	1,079	—	—
1954	13,001	13,230	270	97	3,200	986	27	829	592	1,157	—	—
1955	19,222	19,338	108	146	3,792	788	35	804	589	1,149	—	—
1956	12,752	12,842	888	322	7,534	1,440	56	1,271	480	936	—	—
1957	23,950	24,119	960	293	10,727	2,140	59	1,551	334	649	—	—
1958	6,470	6,511	410	166	11,743	2,920	76	2,501	446	870	89	1,011
1959	4,106	4,118	238	304	10,737	2,166	57	1,628	598	1,169	66	648
1960	18,662	18,738	229	415	15,407	3,111	80	2,224	809	1,601	90	713
1961	78,754	79,271	83	325	10,776	2,364	48	1,267	1,035	2,101	132	1,198
1962	14,090	12,195	45	563	12,850	2,753	110	2,945	1,069	2,209	159	1,441
1963	12,970	13,048	33	532	12,610	2,799	53	1,390	1,495	2,898	183	1,717
1964	11,975	12,045	18	1,080	8,069	1,767	27	695	1,381	2,743	263	2,571
1965	15,956	16,127	662	1,229	11,131	2,210	77	1,747	1,562	3,040	330	3,194
1966	25,909	26,147	124	1,521	8,064	1,702	106	2,404	2,657	6,967	430	4,181
1967	14,930	15,107	177	2,214	5,985	1,229	193	4,161	8,530	50,890	443	4,440
1968	11,602	11,816	58	2,330	—	—	164	3,408	14,563	104,506	462	4,645
1969	11,228	12,701	161	1,843	65	8	179	3,624	19,898	151,797	557	5,751
1970	12,037	13,874	41	1,386	56	4	161	3,086	31,542	233,580	573	6,068
1971	14,665	15,760	—	1,511	45	10	159	2,755	46,273	341,702	563	6,631
1972	17,646	21,950	—	2,043	40	3	(h) —	(h) —	48,658	347,500	580	7,416
1973	16,314	30,193	6	2,277	—	—	(h) —	(h) —	66,036	420,255	595	7,696
1974	10,093	27,393	15	2,732	—	—	(h) —	(h) —	79,286	488,239	728	9,774
1975	9,263	36,666	—	3,019	—	—	(h) —	(h) —	88,070	699,843	672	9,893
1976	13,659	50,527	—	2,538	—	—	(h) —	(h) —	83,090	772,199	647	9,995
1977	9,980	36,863	—	3,939	81	39	(h) 72	(h) 9	84,939	900,987	1,184	20,155
1978	10,344	50,906	—	4,947	(i) —	(i) —	(h) —	(h) —	80,128	935,018	986	17,653
1979	n.a. (j) 99,708	—	—	5,074	(i) —	(i) —	(h) —	(h) —	84,016	978,315	883	17,475
1980	n.a. (j) 56,317	—	220	5,841	—	—	(h) —	(h) —	76,725	1,025,660	1,119	25,433
1981	1,279	22,024	—	2,469	—	—	(h) —	(h) —	72,756	1,069,087	929	23,726

(a) From 1980 figures relate to overseas exports only. (b) From 1920, year ended 30 June. (c) Gold sold abroad before consignment is not recorded as an export until actually shipped. (d) Includes silver-lead and silver-lead-zinc ores and concentrates. (e) From 1973, figures exclude interstate exports of lead ores and concentrates, and from 1978 interstate exports of zinc ores and concentrates. (f) From 1972, figures exclude overseas exports of beneficiated ilmenite; from 1978, figures also exclude interstate exports of all ilmenite and leucoxene. (g) Includes additional premiums on sales of industrial gold. (h) Overseas details are not available for publication. (i) Represents overseas exports only. (j) Includes all processed gold, but excludes gold ores and concentrates.

EXTERNAL TRADE
(\$'000)

Year (a)	Imports (b)			Exports (b) (c)			Excess of—		Ships' stores
	Overseas	Interstate	Total	Overseas	Interstate	Total	Imports	Exports	
1850	n.a.	n.a.	125	n.a.	n.a.	44	80	..	n.a.
1860	318	20	338	160	16	175	163	..	3
1870	260	167	427	348	46	394	33	..	8
1880	349	358	707	736	252	988	..	280	11
1890	1,025	724	1,749	961	369	1,330	419	..	14
1900	6,574	5,350	11,924	11,246	2,250	13,496	..	1,572	208
1910	8,750	7,067	15,817	11,679	4,627	16,306	..	489	294
1920	9,918	14,819	24,737	28,918	2,392	31,311	..	6,574	827
1926	15,792	17,133	32,925	25,223	2,876	28,100	4,826	..	1,064
1927	18,894	17,858	36,752	26,135	2,810	28,946	7,806	..	1,358
1928	18,023	18,553	36,575	32,505	2,674	35,179	1,396	..	1,302
1929	18,906	21,201	40,108	30,603	2,411	33,014	7,094	..	1,358
1930	17,758	19,805	37,563	32,009	2,213	34,223	3,341	..	1,316
1931	9,165	13,639	22,804	33,306	1,550	34,856	..	12,052	1,095
1932	6,926	15,854	22,780	29,633	1,826	31,459	..	8,679	1,133
1933	9,542	16,740	26,282	28,037	1,916	29,953	..	3,671	1,122
1934	8,889	18,554	27,443	31,132	2,427	33,559	..	6,116	1,024
1935	10,203	20,290	30,493	30,002	2,650	32,652	..	2,158	1,106
1936	12,688	22,073	34,761	33,023	3,665	36,689	..	1,928	1,095
1937	14,144	24,742	38,886	34,592	6,361	40,953	..	2,067	1,029
1938	15,986	25,879	41,865	38,944	6,057	45,001	..	3,135	1,200
1939	12,275	25,329	37,604	34,149	10,815	44,964	..	7,360	1,049
1940	12,568	27,450	40,017	19,256	28,518	47,774	..	7,756	1,380
1941	9,710	27,519	37,229	16,900	30,808	47,708	..	10,479	1,971
1942	10,391	26,110	36,501	23,157	25,241	48,398	..	11,897	2,305
1943	7,383	24,803	32,186	10,625	20,117	30,741	1,445	..	1,983
1944	7,770	26,628	34,399	22,845	13,472	36,317	..	1,919	2,747
1945	9,215	26,863	36,079	24,765	11,533	36,298	..	219	2,508
1946	11,018	32,238	43,256	38,917	11,662	50,579	..	7,322	2,511
1947	18,929	42,253	61,182	46,015	11,459	57,474	3,708	..	1,966
1948	34,311	51,329	85,640	97,389	11,599	108,989	..	23,349	2,474
1949	44,075	61,182	105,258	96,982	9,495	106,477	..	1,220	4,710
1950	68,844	70,044	138,887	106,590	12,421	119,011	19,876	..	4,720
1951	80,517	95,828	176,345	197,686	18,780	216,466	..	40,122	7,249
1952	120,474	124,209	244,683	151,562	35,404	186,966	57,717	..	8,419
1953	59,748	137,213	196,961	166,286	49,659	215,945	..	18,984	10,321
1954	85,051	165,374	250,425	136,849	39,190	176,039	74,386	..	7,266
1955	101,295	182,110	283,405	137,013	47,310	184,323	99,082	..	7,865
1956	92,963	177,952	270,915	152,286	68,466	220,752	50,164	..	10,592
1957	80,423	188,680	269,103	216,599	81,545	298,144	..	29,041	12,902
1958	91,775	195,103	286,879	179,516	79,836	259,352	27,527	..	11,602
1959	89,972	202,430	292,402	174,585	68,919	243,504	48,898	..	9,482
1960	92,363	246,696	339,059	231,766	77,278	309,043	30,016	..	8,954
1961	110,531	245,474	356,005	309,332	89,922	399,254	..	43,249	10,285
1962	100,178	245,208	345,386	287,619	84,626	372,245	..	26,859	9,379
1963	112,640	313,712	426,351	246,823	91,636	338,459	87,892	..	7,904
1964	121,677	323,176	444,854	286,132	101,811	387,943	56,911	..	9,733
1965	153,540	343,899	497,439	243,078	119,954	363,033	134,407	..	9,009
1966	175,690	403,054	578,744	314,404	119,619	434,023	144,721	..	10,058
1967	159,390	474,852	634,242	421,325	116,030	537,355	96,887	..	10,936
1968	206,980	527,052	734,031	475,260	124,505	599,765	134,266	..	14,824
1969	203,533	562,312	765,846	546,366	149,892	696,258	69,588	..	14,327
1970	242,299	640,189	882,487	675,027	149,861	824,888	57,600	..	15,092
1971	278,344	726,778	1,005,122	862,421	163,812	1,026,233	..	21,111	20,561
1972	283,263	787,788	1,071,051	946,504	156,303	1,102,807	..	31,756	22,477
1973	227,305	786,177	1,013,483	1,154,359	173,839	1,328,198	..	314,715	17,542
1974	368,910	939,361	1,308,272	1,414,968	222,208	1,637,176	..	328,904	29,224
1975	577,416	1,134,510	1,711,926	1,880,082	253,424	2,133,506	..	421,580	50,157
1976	637,439	1,418,726	2,056,165	2,117,898	290,733	2,408,631	..	352,466	46,638
1977	829,411	1,641,545	2,470,955	2,596,107	305,836	2,901,943	..	430,987	64,141
1978	937,350	1,828,510	2,765,860	2,588,954	355,151	2,944,105	..	178,245	71,009
1979	1,161,164	2,044,447	3,205,611	2,820,134	446,208	3,266,343	..	60,732	72,611
1980	1,449,683	2,337,808	3,787,491	3,854,092	635,388	4,489,480	..	701,989	126,176
1981	1,663,378	2,841,110	4,504,488	3,791,114	812,996	4,604,110	..	99,622	144,285
1982	2,535,112	3,141,096	5,676,208	3,907,613	888,540	4,796,153	880,055	..	134,198

(a) From 1920, year ended 30 June. (b) From 1976, excludes interstate value of horses. Details are not available for publication. (c) Excludes ships' stores.

LAND TENURE; LIVESTOCK; WOOL PRODUCTION

Year	Land alienated and land in process of alienation (a)	Land held under lease or licence (a) (b)	Livestock (c)				Wool production (d)	
			Horses	Cattle	Sheep	Pigs	Quantity	Gross value (e)
	'000 hectares	'000 hectares	'000	'000	'000	'000	tonnes	\$'000
1829	212	—	—	—	1	—	n.a.	—
1830	256	—	—	1	8	—	n.a.	—
1840	647	—	1	2	31	2	n.a.	—
1850	538	—	3	13	128	3	n.a.	—
1860	614	2,251	10	32	260	11	298	n.a.
1870	593	4,953	22	45	609	13	811	—
1880	860	18,179	35	64	1,232	24	1,970	—
1890	2,159	42,388	44	131	2,525	29	3,161	—
1900	2,679	35,360	68	339	2,434	62	4,323	—
1910	7,013	67,667	134	825	5,159	58	13,210	2,141
1920	9,317	104,252	179	850	6,533	61	18,947	4,552
1930	14,585	99,307	157	813	9,883	101	32,451	4,829
1931	14,653	87,667	156	827	10,098	121	32,484	5,007
1932	14,516	83,432	157	857	10,417	118	34,086	5,198
1933	14,386	80,260	160	886	10,322	91	35,573	9,404
1934	14,201	81,176	162	912	11,197	98	40,820	6,422
1935	13,807	82,396	160	883	11,083	98	38,876	8,886
1936	13,353	82,541	155	793	9,008	76	28,820	7,306
1937	13,356	82,985	151	740	8,732	65	29,365	5,832
1938	13,358	83,363	144	768	9,178	83	32,874	5,450
1939	13,261	83,247	139	799	9,574	150	34,201	7,581
1940	13,127	84,733	130	789	9,516	218	32,362	7,889
1941	12,995	84,968	124	840	9,773	163	35,211	8,328
1942	12,895	85,607	113	831	10,424	152	43,417	11,935
1943	12,812	85,810	107	871	11,013	164	46,611	12,741
1944	12,797	86,076	97	853	10,050	164	38,166	10,512
1945	12,836	85,928	88	834	9,766	138	37,225	10,424
1946	12,861	85,860	81	812	9,787	102	36,525	16,094
1947	13,061	87,910	75	816	10,444	93	40,609	29,277
1948	13,016	90,169	69	864	10,873	81	42,533	37,720
1949	13,178	91,256	59	865	10,923	79	42,071	47,237
1950	13,515	82,101	55	841	11,362	90	46,680	118,068
1951	13,902	82,918	53	852	12,188	86	52,681	64,027
1952	14,296	83,587	50	846	12,475	76	54,760	75,121
1953	14,911	83,218	49	830	13,087	101	58,497	82,567
1954	15,213	84,432	47	861	13,411	107	56,324	67,985
1955	15,385	86,450	45	897	14,128	99	67,932	69,642
1956	15,507	87,332	45	957	14,887	140	67,301	90,283
1957	15,746	89,111	44	997	15,724	151	68,504	75,228
1958	15,925	88,388	41	1,000	16,215	115	71,376	59,407
1959	16,180	92,311	41	1,030	16,412	131	72,979	75,302
1960	16,343	92,640	40	1,100	17,151	176	82,652	73,863
1961	16,637	94,479	40	1,218	18,314	174	83,159	79,283
1962	17,079	99,722	39	1,298	18,727	131	80,366	80,071
1963	17,484	99,364	39	1,299	20,165	128	95,053	116,331
1964	17,848	99,771	37	1,258	22,392	137	91,170	93,275
1965	18,287	99,444	35	1,271	24,427	144	108,116	115,183
1966	18,737	99,764	n.a.	1,357	27,370	161	119,681	121,509
1967	19,192	100,581	n.a.	1,427	30,161	183	131,379	116,653
1968	19,504	100,976	n.a.	1,546	32,901	220	164,307	158,264
1969	19,620	100,716	29	1,681	33,634	250	144,527	120,819
1970	19,761	102,957	—	1,781	34,709	278	151,808	92,009
1971	19,545	103,389	—	1,975	34,405	427	170,219	135,137
1972	19,531	103,218	—	2,182	30,919	476	140,649	225,041
1973	19,539	102,711	—	2,330	32,451	344	143,147	251,712
1974	19,493	101,408	n.a.	2,544	34,476	264	172,659	218,859
1975	19,505	99,899	—	2,654	34,771	260	174,807	242,027
1976	18,686	100,053	—	2,464	31,158	242	156,237	291,358
1977	18,723	99,360	—	2,271	29,823	237	r 143,127	258,034
1978	18,779	99,319	—	2,092	30,265	271	r 150,284	286,601
1979	18,905	97,074	41	2,065	30,431	293	r 147,840	348,214
1980	18,958	98,139	39	2,033	30,764	289	r 160,096	401,030
1981	19,072	97,988	37	1,942	30,268	263	145,194	378,540

(a) From 1910 to 1946 at 30 June; for earlier years and from 1947 at 31 December. (b) Comprises allocations by Lands Department and certain leases and licences issued by Mines and Forests Departments. Apparent decrease in 1950 due mainly to revisions in records of Lands Department. (c) At 31 December for 1941 and earlier years; from 1942, the figures shown relate to 31 March in the following year. (d) Comprises shorn, dead and fellmongered wool. Excludes wool exported on skins. For 1947 and earlier, year ended 31 December; figures shown for 1948 to 1964 are for the year ended 31 March in the following year. From 1965 figures relate to the year ended 30 June in the following year. (e) Figures for 1949 and 1951 to 1955 exclude distributions of profits under the 1939-1945 War-time Wool Disposals Plan aggregating \$13,869,934. Separate State figures are not available for distributions made from 1956 to 1958 when payments were virtually complete.

AGRICULTURE

Area and production of principal grain crops									
Year (a)	Total area used for crops (b)	Wheat				Oats		Barley	
		Production				Area	Production	Area	Production
		Area	Yield per hectare	Total	Gross value				
	'000 hectares	'000 hectares	tonnes	'000 tonnes	\$'000	'000 hectares	'000 tonnes	'000 hectares	'000 tonnes
1840	1	1	1.11	1	—	n.a.	n.a.	n.a.	n.a.
1850	3	2	n.a.	n.a.	—	n.a.	n.a.	n.a.	n.a.
1860	10	6	1.00	6	n.a.	—	—	1	1
1870	22	11	0.79	9	—	1	1	2	2
1880	26	11	0.62	7	—	—	—	2	2
1890	28	14	0.92	13	—	—	1	2	2
1900	81	30	0.70	21	310	2	2	1	1
1910	346	236	0.68	161	2,162	25	14	4	3
1920	730	516	0.65	333	11,023	78	37	—	—
1921	770	541	0.70	378	7,532	66	37	3	2
1922	921	628	0.60	377	6,986	87	41	4	2
1923	940	671	0.77	515	8,987	98	52	4	2
1924	1,097	756	0.86	650	14,532	129	77	5	4
1925	1,187	855	0.65	557	12,837	113	53	5	4
1926	1,346	1,040	0.81	846	17,217	95	49	6	3
1927	1,505	1,214	0.82	990	19,842	95	53	5	3
1928	1,724	1,353	0.68	920	16,473	132	65	6	4
1929	1,848	1,444	0.74	1,064	17,721	156	74	10	6
1930	1,939	1,601	0.91	1,456	12,201	111	60	7	4
1931	1,604	1,278	0.88	1,130	14,430	108	64	6	4
1932	1,725	1,371	0.83	1,137	13,554	116	65	6	3
1933	1,707	1,288	0.79	1,015	12,004	139	72	10	7
1934	1,554	1,119	0.66	734	10,123	166	77	11	5
1935	1,508	1,028	0.62	635	9,747	181	83	13	9
1936	1,559	1,042	0.56	586	11,902	187	63	16	10
1937	1,687	1,225	0.81	986	14,830	156	79	18	13
1938	1,895	1,381	0.73	1,003	8,984	172	85	30	21
1939	1,735	1,202	0.93	1,112	15,526	183	96	34	22
1940	1,614	1,062	0.54	573	8,648	174	59	27	16
1941	1,545	1,073	0.95	1,021	15,615	165	97	28	22
1942	1,127	709	0.79	561	10,080	138	66	20	12
1943	1,110	634	0.71	450	9,531	145	72	25	16
1944	1,115	614	0.71	434	8,319	163	70	31	20
1945	1,163	743	0.77	570	15,871	160	74	27	15
1946	1,429	982	0.66	648	22,048	172	66	27	12
1947	1,593	1,117	0.84	939	50,265	200	98	25	17
1948	1,660	1,161	0.85	987	42,122	215	127	26	22
1949	1,737	1,171	0.89	1,048	51,339	237	132	28	22
1950	1,834	1,289	1.05	1,358	65,328	237	144	24	21
1951	1,824	1,253	0.87	1,089	58,984	266	140	23	16
1952	1,877	1,214	0.80	965	55,194	337	189	43	40
1953	1,812	1,168	0.93	1,030	55,423	297	174	85	62
1954	2,041	1,206	0.77	933	43,655	354	174	105	64
1955	2,118	1,170	1.24	1,449	68,840	442	300	136	106
1956	2,080	1,119	0.78	874	44,055	425	189	139	85
1957	2,230	1,197	0.75	901	45,912	467	250	124	81
1958	2,434	1,332	1.18	1,569	77,639	538	410	130	123
1959	2,583	1,505	1.06	1,597	82,361	502	356	170	161
1960	2,734	1,627	1.07	1,739	92,290	538	396	219	193
1961	2,823	1,773	1.01	1,788	100,023	498	366	199	165
1962	2,965	1,944	1.01	1,973	107,023	476	367	158	137
1963	2,714	1,878	0.76	1,424	74,389	455	324	121	92
1964	2,950	2,085	0.82	1,717	88,557	466	254	123	84
1965	3,419	2,489	1.12	2,780	153,050	502	422	167	147
1966	3,463	2,569	1.09	2,809	153,157	487	401	151	152
1967	3,595	2,690	1.08	2,911	170,102	469	359	168	159
1968	3,840	2,952	1.04	3,060	151,306	442	416	224	208
1969	3,916	2,747	0.66	1,815	90,961	461	281	364	273
1970	3,831	2,361	1.25	2,957	153,227	520	520	632	769
1971	3,751	2,042	1.06	2,165	115,934	454	414	911	1,000
1972	3,855	2,437	0.82	2,003	109,399	297	212	744	640
1973	4,133	2,978	1.41	4,211	461,049	325	383	510	626
1974	3,758	2,810	1.17	3,277	361,211	262	250	387	329
1975	4,207	3,171	1.30	4,122	427,507	320	386	419	505
1976	4,416	3,314	0.98	3,249	290,489	372	347	452	553
1977	4,910	3,609	0.82	2,945	r 292,901	415	416	614	751
1978	4,993	3,706	1.19	4,400	546,827	427	491	616	778
1979	5,280	4,121	0.91	3,739	571,158	370	399	523	632
1980	5,547	4,333	0.77	3,315	r 508,734	382	384	535	504
1981	5,963	4,593	1.05	4,803	759,763	432	442	580	576

(a) Figures shown for 1942 and earlier are for the year ended last day of February in the following year; those shown for 1943 and later are for the season ended 31 March in the following year. (b) Excludes pasture hay and from 1967 also excludes lucerne.

PRIMARY PRODUCTION — MISCELLANEOUS

Year	Hay (all kinds) (a)		Gold production (b) (c)		Coal production (c)		Average values f.o.b.	
	Area	Production	Quantity	Value (d)	Quantity	Value	Wool (greasy) per kg (e)	Wheat per tonne (f)
	'000 hectares	'000 tonnes	'000 grams	\$'000	'000 tonnes	\$'000	cents	\$
1860	2	8	—	—	—	—	—	19.83
1870	7	21	—	—	—	—	—	—
1880	8	20	—	—	—	—	n.a.	18.37
1890	9	25	622	171	—	—	—	—
1900	42	106	43,980	12,015	120	110	—	5.51
1910	71	182	45,753	12,494	266	227	16.20	14.85
1920	108	268	19,222	6,951	469	701	28.26	26.33
1921	136	375	17,231	5,907	477	814	24.07	26.94
1922	175	464	16,734	5,052	445	763	22.95	20.21
1923	134	374	15,707	4,464	428	738	33.60	18.53
1924	161	456	15,085	4,512	429	727	41.78	17.45
1925	158	361	13,717	3,749	444	726	45.97	22.35
1926	145	431	13,592	3,715	483	789	30.78	23.04
1927	144	424	12,690	3,469	510	816	28.31	20.29
1928	168	429	12,224	3,342	536	840	35.52	20.05
1929	170	435	11,726	3,204	554	853	29.87	18.60
1930	161	500	13,001	3,729	509	770	19.37	16.69
1931	154	460	15,894	5,996	439	672	14.77	8.42
1932	169	493	18,849	8,807	423	541	15.50	11.48
1933	194	520	19,813	9,773	465	580	15.74	11.18
1934	167	470	20,248	11,118	508	557	28.75	10.79
1935	200	513	20,186	11,404	546	636	17.73	11.79
1936	193	420	26,314	14,747	574	663	24.98	14.62
1937	175	457	31,135	17,488	563	681	29.70	20.29
1938	165	445	36,329	20,726	615	750	24.25	15.08
1939	160	484	37,760	23,686	567	726	19.58	8.95
1940	169	381	37,044	25,393	548	729	25.68	11.19
1941	132	421	34,494	23,703	566	779	28.70	14.49
1942	102	282	26,376	17,731	590	923	28.64	15.12
1943	114	319	16,982	11,421	541	979	32.19	15.09
1944	133	344	14,494	9,800	567	1,166	34.81	17.71
1945	114	292	14,588	10,021	552	1,146	34.24	23.30
1946	112	284	19,191	13,280	652	1,460	34.92	31.81
1947	93	272	21,897	15,151	743	1,680	45.64	48.42
1948	92	281	20,684	14,314	745	1,760	76.41	64.33
1949	87	276	20,155	15,926	763	1,944	94.20	56.11
1950	72	231	18,973	18,933	827	2,575	105.91	57.03
1951	70	215	19,533	19,451	862	3,434	263.50	62.25
1952	92	295	22,706	23,696	843	4,915	138.10	62.64
1953	89	299	25,629	26,598	900	6,146	148.04	63.57
1954	117	310	26,469	26,627	1,034	7,178	156.20	60.90
1955	109	390	26,189	26,749	919	6,179	135.39	52.22
1956	98	293	25,256	26,405	843	5,448	112.66	46.57
1957	137	392	27,900	29,102	852	5,105	144.67	48.12
1958	135	462	26,967	28,357	885	4,561	130.80	56.35
1959	129	440	26,967	28,388	926	4,713	91.87	51.76
1960	115	387	26,625	28,140	937	4,878	115.37	49.48
1961	119	402	27,122	28,584	778	3,361	99.10	49.91
1962	138	460	26,717	28,115	934	3,962	109.80	51.90
1963	117	395	24,883	26,375	916	3,970	111.38	52.30
1964	123	396	22,177	23,383	1,003	4,679	134.47	52.01
1965	118	421	20,497	22,381	1,010	4,410	120.58	51.66
1966	119	424	19,564	23,316	1,078	4,562	116.00	51.12
1967	129	428	17,916	21,690	1,079	4,765	117.46	54.88
1968	138	508	15,925	19,407	1,104	4,817	105.69	51.31
1969	202	576	14,961	19,040	1,120	4,853	107.60	51.26
1970	190	673	12,310	15,811	1,178	5,407	98.11	47.72
1971	177	653	10,736	13,674	1,190	5,653	75.33	48.88
1972	224	664	10,848	14,835	1,188	5,855	74.94	49.52
1973	220	734	9,264	16,718	1,154	6,422	150.21	49.67
1974	164	508	7,173	19,183	1,197	7,237	215.36	98.75
1975	163	536	6,305	29,788	1,879	12,511	144.37	126.39
1976	169	560	7,644	27,141	2,157	17,613	147.62	116.89
1977	191	597	7,619	31,586	2,339	21,896	188.10	105.10
1978	184	586	13,653	64,741	2,435	24,846	195.76	(g) 92.52
1979	208	636	12,231	78,313	2,406	34,484	207.87	(g) 116.53
1980	240	703	11,598	158,253	3,039	54,464	(g) 253.81	(g) 146.45
1981	255	711	10,532	165,376	3,127	63,100	(g) 270.01	(g) 160.32

(a) See footnote (a) on preceding page. (b) Prior to 1971 comprises gold refined at the Mint and gold contained in gold-bearing materials exported. From 1971 covers gold production as notified by the Department of Mines. (c) From 1969 figures relate to year ended 30 June. (d) Includes amounts distributed by the Gold Producers' Association Ltd. from premiums on sales of Western Australian gold and net subsidy payments by the Commonwealth Government, under the *Gold Mining Industry Assistance Act* 1954. (e) From 1920 figures relate to year ended 30 June. (f) Prior to 1940 averages generally are based on exports of the previous season's wheat; from 1940 they relate to exports during the year ended 30 June. (g) Overseas exports only.

VALUE OF PRIMARY COMMODITIES PRODUCED
(Excluding Mining)
(\$'000)

Gross value of primary commodities produced (excluding mining) (b)							
Year (a)	Agri- culture	Dairying, poultry farming and bee keeping	Pastoral (c)	Hunting	Forestry	Fisheries (d)	Total (d)
1920	17.466	2.065	(e) 9.008			n.a.	
1921	13.853	2.265	(e) 8.032		n.a.		n.a.
1922	12.992	2.350	(e) 10.584				
1923	15.076	2.483	(e) 13.027			642	
1924	22.367	2.726	(e) 13.419			764	
1925	19.510	2.507	(e) 11.537		4.126	970	38.651
1926	24.187	2.503	(e) 11.262		3.367	580	41.899
1927	26.068	2.687	(e) 14.687		2.906	516	46.865
1928	23.884	2.936	(e) 13.501		2.463	561	43.344
1929	24.504	3.443	(e) 10.800		2.159	544	41.450
1930	17.756	3.170	(e) 8.845		1.809	485	32.066
1931	20.985	3.311	(e) 8.023		1.312	427	34.058
1932	20.495	3.338	(e) 8.057		1.183	430	33.502
1933	19.022	3.315	(e) 13.369		1.648	406	37.759
1934	16.336	3.927	9.329	127	2.399	373	32.491
1935	17.045	3.897	12.439	200	2.653	372	36.606
1936	18.871	4.170	11.016	421	3.032	465	37.974
1937	21.071	4.494	9.947	193	2.957	592	39.254
1938	17.077	4.716	9.326	131	2.899	561	34.711
1939	23.198	4.855	11.463	139	2.660	562	42.877
1940	14.760	5.230	11.460	241	3.160	539	35.391
1941	22.219	5.960	11.958	276	2.950	479	43.843
1942	18.106	7.664	16.155	190	3.277	255	45.647
1943	18.505	7.971	18.156	225	3.150	347	48.353
1944	20.856	8.473	15.385	215	3.152	330	48.411
1945	26.310	8.709	15.948	281	3.358	438	55.044
1946	32.635	8.933	21.986	465	3.305	635	67.959
1947	64.699	9.790	37.036	395	3.649	1,135	116.703
1948	58.785	11.964	46.254	517	4.024	1,379	122.924
1949	69.686	12.975	58.687	393	4.501	1,432	147.674
1950	87.752	14.155	131.921	499	6.741	1,649	242.716
1951	86.791	18.778	79.955	488	8.517	2,505	197.034
1952	87.127	21.289	90.639	461	7.155	3,286	209.956
1953	86.533	22.328	101.567	609	7.678	3,808	222.523
1954	77.164	21.762	87.435	335	8.116	4,383	199.195
1955	109.709	22.433	89.293	361	10.474	4,915	237.185
1956	80.170	23.240	112.885	277	10.305	5,563	232.441
1957	87.293	23.500	94.118	175	11.046	6,530	222.662
1958	126.672	22.838	81.639	125	10.903	7,818	249.995
1959	131.052	24.696	100.255	288	10.919	8,621	275.831
1960	140.003	25.917	101.051	579	11.082	8,569	287.201
1961	148.765	26.400	105.310	511	11.104	10,689	302.779
1962	157.948	27.387	107.280	376	10.877	11,219	315.087
1963	123.342	28.723	148.701	632	11.462	10,187	323.047
1964	139.426	30.884	125.837	775	12.093	15,218	324.233
1965	215.949	32.899	157.249	836	12.731	15,733	435.397
1966	218.206	33.022	159.857	986	13.300	16,525	441.895
1967	234.020	35.485	158.754	1,236	14.076	21,954	465.524
1968	218.854	38.801	210.780	1,211	13.465	23,717	506.828
1969	153.805	40.459	176.387	1,098	13.632	19,660	405.041
1970	256.862	42.330	146.198	834	16.174	25,127	487.525
1971	216.969	45.170	199.443	838	14.660	30,817	507.896
1972	203.417	50.137	321.111	2,132	14.607	28,158	619.561
1973	604.907	59.648	369.636	1,739	15.264	30,494	1,081.687
1974		(f) 845.169		1,657	19.995	35,130	901.951
1975		996.633		1,744	23.404	51,079	1,071.861
1976		959.160		2,622	26.349	69,094	1,057.226
1977		r 993.889		2,675	28.016	88,340	r 1,112.920
1978		r 1,343.932		4,842	27.612	r 80,233	r 1,456.619
1979		r 1,572.744		3,704	34.473	r 85,597	r 1,696.518
1980		1,686.586		n.a.	n.a.	82,764	n.a.
1981		1,877.523		n.a.	n.a.	98,999	n.a.

(a) Figures generally are for the season or financial period ending in the following year. (b) Estimated value of recorded production based on wholesale prices realised at the principal market. (c) In addition the following amounts were paid as interim distribution of profits under the 1939-1945 War-time Wool Disposals Plan: in 1949, \$3,629,478; in 1951, \$3,629,478; in 1952, \$2,325,324; in 1953, \$368,104; in 1954, \$2,120,460; and in 1955, \$1,797,090. Separate State figures are not available for distributions made from 1956 to 1958 when payments were virtually complete. (d) Figures for 1979 exclude pearling and whaling. (e) Separate details not available. (f) From 1974 this dissection has been contracted to the single industry 'Agriculture'.

FACTORIES (a)

Year (b)	Production of selected commodities										Timber from local logs (l)
	Fac- tories	Persons em- ployed (c)	Wages and salaries (d)	Output (e)	Net pro- duc- tion (f)	Bricks (g)	Scoured wool (h)	Bacon and ham (i)	Butter (j)	Flour (plain) (k)	
	No.	No.	\$'000	\$'000	\$'000	'000	tonnes	tonnes	tonnes	tonnes	'000 cu m
1900	632	11,166	2,589	n.a.	n.a.	25,234	—	n.a.	132	11,375	266
1910	822	14,894	3,532	10,158	5,472	23,162	—	n.a.	291	33,401	412
1920	998	16,942	6,073	26,283	9,708	31,838	n.a.	850	553	108,976	325
1930	1,466	19,643	8,310	33,783	14,976	47,720	—	1,180	2,143	109,402	377
1931	1,455	14,619	5,774	24,707	10,562	13,630	—	1,321	3,222	119,830	265
1932	1,490	13,392	4,671	22,375	9,212	15,101	—	1,318	3,787	118,991	136
1933	1,499	14,810	5,083	24,655	10,124	25,673	—	1,567	4,292	115,733	140
1934	1,606	16,154	5,505	25,755	10,889	31,717	1,324	1,932	4,456	110,677	228
1935	1,658	17,769	6,222	29,283	12,570	37,552	1,633	2,068	5,072	112,609	291
1936	1,946	20,972	7,408	35,057	15,008	50,498	1,533	2,411	4,975	107,356	391
1937	2,032	22,712	8,315	36,626	15,893	53,270	1,129	1,972	4,827	111,332	458
1938	2,066	23,133	8,803	39,288	17,125	57,598	1,358	1,976	6,215	113,826	400
1939	2,129	23,211	9,147	39,097	17,551	53,062	1,673	1,911	6,647	124,786	443
1940	2,129	22,967	9,150	40,615	18,055	43,786	2,459	2,106	6,351	127,776	382
1941	2,056	22,734	9,441	43,650	18,034	45,505	3,867	2,325	6,454	136,010	431
1942	1,938	23,980	10,999	47,904	20,201	34,247	2,709	2,773	7,103	122,777	589
1943	1,799	25,813	12,956	53,475	22,906	8,926	3,455	4,172	6,549	114,554	735
1944	1,807	28,101	14,835	58,417	25,023	6,296	4,437	4,391	6,254	144,967	804
1945	1,931	29,146	15,228	63,481	25,920	10,003	4,274	5,051	5,767	146,683	835
1946	2,280	30,256	15,768	68,046	27,653	24,150	3,899	4,646	5,694	151,310	824
1947	2,615	33,806	18,210	76,540	31,497	37,758	5,417	4,677	6,052	160,323	1,033
1948	2,788	35,967	21,471	91,252	36,768	44,986	5,334	4,018	7,086	177,352	1,035
1949	2,925	38,354	25,856	106,835	42,948	50,378	6,467	3,610	7,078	164,623	884
1950	3,023	40,733	30,586	127,956	52,088	58,943	7,110	3,599	6,878	144,691	712
1951	3,111	43,761	39,316	168,862	68,441	67,312	5,828	3,615	6,906	197,172	760
1952	3,267	45,097	50,769	213,143	85,491	76,884	5,884	3,739	6,813	201,255	634
1953	3,424	45,188	56,687	238,620	98,383	86,043	6,162	3,752	6,584	203,509	909
1954	3,523	47,459	63,181	269,174	110,294	101,240	6,914	3,503	6,241	170,513	1,224
1955	3,727	49,314	69,476	299,169	121,912	115,412	7,226	3,369	7,260	150,381	1,100
1956	3,871	50,108	74,413	350,293	139,466	102,359	9,483	3,283	7,523	162,715	775
1957	3,935	48,748	73,833	375,272	146,884	101,209	11,044	3,103	7,582	153,800	1,201
1958	3,941	48,462	75,870	392,525	150,624	111,082	11,708	2,999	6,916	134,398	1,033
1959	4,125	48,417	77,464	392,405	157,524	101,521	12,791	3,002	6,265	126,736	1,200
1960	4,279	49,651	83,285	431,165	172,747	110,359	15,271	3,228	7,494	136,780	1,466
1961	4,334	50,666	90,255	481,140	193,262	119,998	13,420	3,214	7,784	152,622	1,373
1962	4,418	51,033	92,840	486,988	196,083	119,868	14,459	3,556	7,603	128,007	1,386
1963	4,492	53,435	99,880	517,899	216,422	131,176	13,312	3,899	7,075	123,296	1,462
1964	4,609	55,705	108,515	555,058	230,511	155,792	12,464	3,841	7,026	129,996	1,530
1965	4,734	58,097	119,978	616,422	260,637	146,057	12,040	4,047	7,887	121,906	1,838
1966	4,906	60,282	134,171	678,751	288,803	140,611	12,107	4,357	8,225	103,115	1,230
1967	5,167	63,757	153,597	765,224	335,788	163,166	12,148	4,654	6,529	91,725	1,726
1968	5,404	67,335	175,100	887,372	388,257	207,575	12,662	5,173	6,009	100,418	1,983
1969	2,585	59,853	183,168	919,555	361,473	273,078	14,415	5,591	6,332	96,641	2,022
1970	2,705	62,597	208,410	1,028,778	414,999	288,949	14,940	5,399	5,915	92,635	1,718
1971	(m)	(m)	(m)	(m)	(m)	240,323	10,724	4,863	5,425	96,411	1,917
1972	2,727	64,217	255,879	1,240,106	472,013	227,581	17,009	5,116	5,988	84,227	1,979
1973	2,814	64,074	275,455	1,375,859	501,034	278,610	11,987	5,257	5,324	77,680	1,869
1974	2,818	67,884	346,942	1,741,029	658,412	304,178	10,791	5,530	5,223	79,114	1,922
1975	1,974	65,852	434,272	2,032,374	779,842	262,905	11,779	5,294	4,981	84,486	2,291
1976	2,054	65,953	508,931	2,432,654	944,459	328,356	13,969	5,439	4,531	78,447	2,673
1977	2,035	66,750	594,514	2,882,421	1,151,619	385,942	15,818	5,836	3,340	n.a.	2,074
1978	2,037	65,740	629,095	3,031,505	1,208,749	357,391	13,308	5,666	2,212	n.a.	1,812
1979	2,202	65,232	670,772	3,498,828	1,321,683	381,092	16,129	5,516	1,373	n.a.	2,364
1980 r	2,301	65,987	734,204	4,259,065	1,643,325	404,954	20,128	5,930	995	n.a.	2,866
1981	2,426	68,870	869,223	4,902,236	1,876,664	381,909	21,645	6,062	834	n.a.	3,342

(a) Prior to 1968-69 a factory was defined for statistical purposes as any establishment engaged in the processes of manufacturing, assembling, treating or repairing and in which four or more persons were employed during any period of the year, or power other than manual was used. For 1968-69 and later, direct comparisons of statistics of number of factories, persons employed, wages and salaries, output and net production with those for earlier years are not possible (see introduction to Chapter VIII). Figures for 1974-75 and later, exclude details of single establishment enterprises with less than four persons (see Section *Manufacturing Statistics*). (b) From 1930 year ended 30 June. (c) Average over whole year including working proprietors. Prior to 1926-27 includes fallers and haulers employed by sawmills. (d) Figures for 1929-30 and later exclude amounts drawn by working proprietors. (e) Selling value 'at the factory'. (f) Value added in course of manufacture, representing sum available for payment of wages, rent, depreciation, other sundry expenses and for interest and profit. (g) For years prior to 1964-65, figures include all types of standard size bricks. Prior to 1929-30, they also include firebricks and blocks. From 1964-65 figures represent clay bricks only (all sizes). (h) Excludes fellmongered, dead or waste wool. (i) From 1977-78 excludes canned bacon and ham. (j) For 1917 and earlier years, includes butter made on farms. Source: from 1978, Western Australian Department of Agriculture. (k) Source: 1933-34 to 1967-68, annual manufacturing census; 1968-69 to 1970-71, Commonwealth Dairy Produce Equalisation Committee Limited; from 1971-72, Western Australian Department of Agriculture. (l) Prior to 1968-69, figures also include hewn timber. (m) A census of manufacturing establishments was not conducted in respect of the year ended 30 June 1971.

INDUSTRIAL DISPUTES: WAGE RATES: UNEMPLOYMENT BENEFIT

Year	Industrial disputes (a)				State basic wage per week (b)		Minimum wage rate index numbers (c)		Unemployment benefit (d)	
	Number of disputes	Workers involved (e)	Working days lost (man-days)		Perth (f)		Adult males (g)		Persons on benefit (h)	
			Number	Average per worker involved	Adult males	Adult females	Weekly	Hourly		
1920	45	'000 12.0	'000 166.6	No. 13.87	\$ (i)	\$ (i)				
1926	9	0.6	9.1	15.11	8.50	4.59				
1927	20	3.4	23.8	7.02	8.50	4.59				
1928	11	2.5	54.9	21.72	8.50	4.59				
1929	4	0.9	2.7	3.05	8.70	4.70	n.a.	n.a.		
1930	2	0.5	27.1	57.85	8.60	4.64				
1931	13	3.9	24.0	6.12	7.35	3.97				
1932	8	2.7	11.1	4.16	7.05	3.81			n.a.	
1933	10	3.9	16.9	4.31	6.92	3.74				
1934	10	3.5	17.8	5.11	7.10	3.83				
1935	11	3.6	72.0	19.98	7.05	3.81				
1936	19	4.7	32.4	6.87	7.38	3.98				
1937	12	1.7	14.4	8.65	7.49	4.04				
1938	7	3.6	43.8	12.01	8.11	4.38				
1939	7	1.3	14.1	11.25	8.22	4.43	35.6	32.0		
1940	4	3.0	7.4	2.44	8.53	4.61	36.8	33.1		
1941	3	0.3	0.8	2.79	9.04	4.88	39.0	35.4		
1942	8	1.8	8.9	4.89	9.78	5.28	41.5	37.6		
1943	10	2.5	38.4	15.11	10.11	5.46	42.8	38.8		
1944	30	11.0	90.0	8.16	9.99	5.39	42.6	38.6		
1945	16	3.8	32.5	8.55	10.01	5.41	42.6	38.7		
1946	11	6.4	69.6	10.94	10.21	5.51	43.6	39.5	422	
1947	7	1.8	6.1	3.44	11.08	5.98	48.4	44.1	1,095	
1948	9	2.4	7.8	3.33	12.16	6.57	53.9	53.9	409	
1949	16	5.7	26.3	4.64	13.59	7.34	59.6	59.7	126	
1950	15	2.0	5.7	2.93	16.65	9.41	71.0	71.7	267	
1951	10	4.2	5.1	1.22	20.57	13.37	85.5	85.7	60	
1952	21	19.2	127.8	6.67	23.85	15.50	97.5	97.7	57	
1953	11	3.7	5.0	1.36	24.65	16.02	100.4	100.7	844	
1954	15	5.5	21.7	3.94	24.65	16.02	101.7	101.9	427	
1955	16	9.8	9.6	0.97	25.24	16.41	106.3	106.6	157	
1956	14	11.1	31.9	2.87	26.52	17.23	110.8	111.0	473	
1957	14	5.4	3.1	0.57	27.28	17.72	113.9	114.1	1,940	
1958	20	11.0	3.0	0.27	27.34	17.78	114.7	114.9	2,330	
1959	20	11.2	11.2	1.00	28.15	18.30	120.7	120.8	2,852	
1960	43	25.7	27.3	1.06	29.46	22.09	126.8	127.1	2,512	
1961	22	9.7	23.2	2.40	29.88	22.41	128.8	129.0	2,154	
1962	28	8.4	6.3	0.75	29.88	22.41	129.5	129.7	2,932	
1963	28	42.6	32.0	0.75	30.15	22.61	132.8	133.0	2,674	
1964	26	6.2	7.1	1.16	31.12	23.34	137.5	137.6	2,677	
1965	33	12.6	10.0	0.79	31.96	23.97	143.4	143.5	1,679	
1966	25	2.9	6.2	2.17	33.50	25.13	153.6	153.8	785	
1967	26	5.1	6.0	1.18	(j)	(j)	159.6	159.9	718	
1968	70	18.7	21.8	1.16	35.45	27.08	169.0	168.7	608	
1969	104	59.1	101.4	1.72	36.45	27.88	179.5	179.3	524	
1970	125	46.5	141.1	3.03	38.45	29.40	198.2	198.0	474	
1971	132	35.8	69.4	1.94	39.45	30.90	219.5	219.4	872	
1972	105	28.3	94.6	3.34	40.45	32.40	234.2	232.5	2,808	
1973	160	37.6	117.3	3.12	44.00	39.00	267.9	266.3	4,960	
1974	257	188.1	256.9	1.37	48.50	43.50	357.7	356.5	2,863	
1975	236	53.8	100.7	1.87	48.50	43.50	401.2	398.5	9,317	
1976	250	100.7	252.1	2.50	48.50	43.50	468.4	466.0	13,598	
1977	229	54.9	220.5	4.02	48.50	43.50	526.0	524.2	15,706	
1978	306	76.1	197.9	2.60	48.50	43.50	560.1	558.2	20,470	
1979	252	169.5	348.1	2.06	48.50	43.50	585.5	583.6	(k) 29,000	
1980	368	69.4	191.0	2.75	48.50	43.50	r 651.9	r 650.3	(k) 29,800	
1981	363	72.4	243.2	3.36	(i)	(i)	p 725.5	p 723.6	28,638	

(a) Excludes disputes involving cessation of work of less than 10 man-days. Details of the number of disputes and workers involved in disputes which commenced in any year and were still in progress during the following year are included in the figures for both years. (b) At 31 December. (c) End of December. Base: weighted average wage rate for Australia, 1954 = 100. (d) Payment commenced 1 July 1945. (e) Includes workers indirectly involved, i.e. those thrown out of work at an establishment where a stoppage occurred but not themselves parties to the dispute. (f) The rates shown for 1964 and later apply uniformly throughout the State. (g) Excludes workers in rural industry. (h) Year ended 30 June; average number of persons on benefit at end of each week. (i) The first State basic wage operated from the beginning of the first pay-period commencing on or after 1 July 1926. It was abandoned with the repeal of the *Industrial Arbitration Act 1912-1979* on 1 March 1980. (j) Special loading of 60 cents a week added to award rates for adult males and adult females operative from the beginning of the first pay-period commencing on or after 1 July 1967. Loading increased to \$1.95 operative from the beginning of the first pay-period commencing on or after 25 October 1968 until 22 November 1968 when loading was absorbed in basic wage. (k) Estimated.

CONSUMER PRICE INDEX (a)

Year ended 30 June	Group index numbers — Perth							Weighted average of six State capital cities	
	Food	Clothing	Housing	House- hold equip- ment and oper- ation	Trans- port- ation	Tobacco and alcohol	Health and personal care	All groups	All groups
1949	12.1	15.9	11.4					14.1	14.0
1950	13.4	18.3	12.1					15.4	15.2
1951	15.4	21.0	13.6					17.2	17.1
1952	19.2	25.4	15.9					21.0	21.0
1953	22.0	26.6	18.2					23.2	22.9
1954	23.3	26.6	19.6					23.9	23.4
1955	24.0	26.7	21.7					24.4	23.6
1956	24.4	27.0	22.5					25.0	24.5
1957	25.5	27.5	22.5					26.2	25.9
1958	25.1	28.1	22.9	n.a.	n.a.	n.a.	n.a.	26.4	26.2
1959	25.3	28.5	23.7					26.6	26.6
1960	26.0	28.8	24.3					27.1	27.3
1961	27.3	29.5	25.8					28.1	28.4
1962	27.2	29.7	26.6					28.2	28.5
1963	27.3	29.8	27.5					28.4	28.6
1964	27.6	30.1	28.4					28.7	28.8
1965	28.7	30.4	29.1					29.6	29.9
1966	30.0	30.8	30.1					30.7	31.0
1967	31.5	31.4	31.6	35.5	32.5	31.5		32.0	31.8
1968	32.5	32.1	33.4	36.1	33.6	32.3		32.9	32.9
1969	33.0	32.8	35.6	36.8	34.2	33.0		33.7	33.7
1970	34.1	33.9	37.9	37.4	35.9	33.3	26.7	35.0	34.8
1971	35.5	35.3	39.7	38.9	37.3	35.7	27.1	36.5	36.5
1972	36.7	37.3	42.2	41.3	39.1	38.7	30.1	38.6	39.0
1973	39.3	39.6	44.2	43.2	40.1	41.3	31.9	40.7	41.3
1974	44.7	45.0	47.1	46.4	43.1	43.8	36.6	45.0	46.6
1975	50.8	54.7	55.0	54.9	51.4	52.8	47.2	53.1	54.5
1976	56.8	63.5	66.2	65.4	60.1	65.0	39.2	60.6	61.5
1977	64.8	73.1	77.2	70.7	67.0	71.3	77.3	70.2	70.0
1978	74.4	81.2	85.1	77.4	73.1	74.8	91.7	77.8	76.7
1979	82.1	87.0	89.2	83.0	81.1	87.3	84.5	84.0	83.0
1980	91.7	92.9	92.5	89.4	90.6	94.4	96.6	91.9	91.4
1981	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1982	110.2	107.2	109.0	109.5	111.9	109.1	130.9	111.2	110.4

(a) The base of each index is Year 1980-81 = 100.

BUILDING COMPLETED (a)

Year ended 30 June	Houses (b) (c)		Other dwellings (b) (d)		Alterations and addi- tions (e) to dwellings	Other building (f)				Total all building (f)
	Number (g)	Value (f)	Number	Value (f)	Value (f)	Factories	Offices	Education	Total	
		\$'000		\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1946	860	1,452	2	4	—	144	—	—	492	1,948
1947	1,792	3,516	—	—	—	98	—	—	716	4,232
1948	2,771	5,784	—	—	—	176	—	—	872	6,656
1949	3,244	7,592	—	—	—	440	—	—	1,822	9,414
1950	3,509	8,974	101	194	—	446	—	—	1,536	10,704
							n.a.	n.a.		
1951	5,160	15,032	305	606	—	410	—	—	2,258	17,896
1952	6,577	24,466	215	300	—	1,402	—	—	4,086	28,852
1953	7,965	37,988	100	334	—	1,668	—	—	7,514	45,836
1954	7,627	39,768	212	834	—	1,734	—	—	10,968	51,570
1955	8,792	48,422	316	1,176	—	6,250	—	—	18,594	68,192
1956	7,760	45,084	584	2,564	—	3,756	842	2,162	19,708	67,356
1957	5,030	29,054	365	1,502	(h)	2,210	2,002	1,162	16,292	46,848
1958	6,196	36,526	171	712	—	2,526	3,906	1,110	17,286	54,524
1959	5,846	34,410	212	840	—	2,792	2,384	4,584	25,274	60,524
1960	5,997	35,454	263	986	—	2,368	1,544	5,838	23,800	60,240
1961	5,973	38,102	440	1,580	—	4,736	4,118	7,956	32,368	72,050
1962	6,082	39,470	265	1,342	—	3,038	2,902	6,014	27,260	68,072
1963	6,593	45,780	642	2,984	—	4,912	1,588	7,724	37,664	86,428
1964	7,276	51,774	1,295	5,596	—	5,384	5,996	6,226	35,498	92,868
1965	7,445	57,238	1,841	9,046	—	6,816	2,820	8,044	40,816	107,100
1966	7,265	58,089	1,624	9,096	—	9,631	10,576	8,459	62,993	130,178
1967	8,272	78,078	1,742	9,322	—	9,841	7,093	10,477	74,735	162,135
1968	9,858	97,370	2,392	12,577	—	15,061	14,608	12,051	85,456	195,403
1969	12,840	133,276	3,491	22,406	—	15,845	10,885	14,122	99,152	254,833
1970	13,933	151,300	5,596	40,519	—	16,615	14,294	13,297	111,577	303,397
1971	11,900	149,267	5,013	39,964	404	18,006	39,736	20,589	175,377	365,012
1972	13,209	165,548	1,595	13,913	1,187	21,336	19,360	16,325	150,790	331,440
1973	13,660	163,396	920	7,308	1,842	15,594	21,245	24,767	151,468	324,013
1974	12,517	176,410	3,546	32,828	2,763	23,430	19,034	21,846	139,163	351,164
1975	10,994	198,605	3,300	38,882	4,427	18,216	18,443	39,965	170,105	412,020
1976	12,080	253,756	2,948	43,989	8,714	22,387	45,695	58,285	227,299	533,757
1977	15,155	394,991	6,152	113,875	15,405	26,640	43,533	29,497	226,433	750,706
1978	12,685	378,760	4,681	98,949	21,496	34,611	18,166	46,109	234,046	733,251
1979	11,148	349,145	3,507	74,864	30,512	43,997	33,250	56,349	339,272	793,794
1980	11,648	380,933	4,156	93,236	33,317	51,514	49,865	33,232	301,934	809,421
1981	10,120	375,465	4,531	107,977	37,477	37,010	75,000	29,650	308,813	829,730

(a) From 1981 figures are not strictly comparable with those for earlier periods. For details see Chapter VII, Part 3. (b) Prior to 1970-71 figures include alterations and additions to dwellings. Data for 1970-71 and later years relate to new dwellings only. (c) From July 1973 dwellings have been classified as *Houses* and *Other dwellings*, replacing the previous categories *Houses* and *Flats*. The separate classifications are not comparable, but the sum of *Houses* and *Other dwellings* and the sum of *Houses* and *Flats* are comparable. (d) Individual living units; prior to 1 July 1973 described as *Flats*. (e) Valued at \$10,000 and over. (f) Excludes the value of land. (g) From 1981 numbers of new houses are rounded to nearest ten units. (h) Not available separately; included with *Houses* and *Other dwellings* as appropriate.

WESTERN AUSTRALIA IN RELATION TO AUSTRALIA

Particulars	Unit	Date or period	Western Australia	Australia	Percentage
Area	sq km	..	2,525,500	7,682,300	32.9
Proportion of area having rainfall —					
Under 250 mm	per cent	..	58.0	39.0	..
250 mm and under 500 mm	per cent	..	29.2	31.8	..
500 mm and over	per cent	..	12.8	29.2	..
Population (a)	number	Dec. 1981	1,317,467	15,053,450	8.8
Population increase	number	1981	32,387	247,148	13.1
Rate of population increase	per cent	1981	2.5	1.7	..
Births registered	number	1981	21,877	235,842	9.3
Deaths registered	number	1981	7,993	109,003	7.3
Marriages registered	number	1981	10,111	113,905	8.9
Divorce — Dissolutions granted	number	1981	3,481	41,412	8.4
Employed labour force (b)	'000	Nov. 1982	574.3	6,350.6	9.0
Average weekly earnings — all male employees (c)	\$	Sept. qtr 1982	343.30	333.70	..
Unemployed on benefit	number	June 1982	37,732	390,664	9.7
Industrial disputes — Working days lost	'000	1981	244.0	4,192.2	5.8
Trade union membership	'000	Dec. 1981	229.1	2,994.1	7.7
Area under crop	'000 hectares	1980-81	5,546	18,273	30.4
Area under sown pasture	'000 hectares	1980-81	6,940	24,912	27.9
Area of —					
Wheat for grain	'000 hectares	1980-81	4,333	11,283	38.4
Oats for grain	'000 hectares	1980-81	382	1,093	34.9
Barley for grain	'000 hectares	1980-81	535	2,451	21.8
Hay	'000 hectares	1980-81	240	1,214	19.8
Fruit and vineyards	'000 hectares	1980-81	9	170	5.3
Livestock —					
Sheep	'000	1980-81	30,764	134,407	22.9
Cattle	'000	1980-81	2,034	25,168	8.1
Pigs	'000	1980-81	289	2,430	11.9
Production —					
Wheat for grain	'000 tonnes	1980-81	3,315	10,856	30.5
Wool (d)	tonne	1980-81	163,652	700,277	23.4
Meat (e)	'000 tonnes	1980-81	226	2,281	9.9
Whole milk	mil. litres	1980-81	214	5,181	4.1
Butter	million kg	1980-81	(f) 0.8	79,374	1.1
Value of agricultural commodities produced	\$m	1980-81	1,687	11,584	14.6
Mining establishments — Value added (g)	\$m	1980-81	(h) 1,434.5	6,213.7	23.1
Gold production	'000 grams	1981-82	(i) 16,009	21,413	74.8
Iron ore production	'000 tonnes	1981-82	82,041	86,236	95.1
Bauxite production	'000 tonnes	1981-82	(i) 11,907	24,987	47.7
Black coal production	'000 tonnes	1981-82	(i) 3,435	100,428	3.4
Crude oil production	'000 cu m	1981-82	(i) 1,237	22,377	5.5
Manufacturing establishments (j) —					
Number (g)	..	1980-81	2,426	27,681	8.8
Employment — Average over whole year (g)	'000	1980-81	68.9	1,149.8	6.0
Wages and salaries paid (g)	\$m	1980-81	869.2	14,911.4	5.8
Value added (g)	\$m	1980-81	1,876.7	28,531.1	6.6
Total new dwellings commenced (k)	number	1981-82	14,610	132,270	11.0
Value of all building commenced (k)	\$m	1981-82	1,043.7	10,504.1	9.9
Overseas imports	\$m f.o.b.	1980-81	1,663.4	18,964.3	8.8
Overseas exports	\$m f.o.b.	1980-81	3,791.1	19,169.2	19.8
Overseas cargo discharged	'000 tonnes	1980-81	5,375.9	22,585.8	23.8
	'000 cu m	1980-81	642.7	9,893.9	6.5
Overseas cargo loaded	'000 tonnes	1980-81	90,317.2	177,603.7	50.9
	'000 cu m	1980-81	92.9	1,808.9	5.1
Motor vehicles on register	'000	June 1981	773.2	7,917.6	9.8
New motor vehicles registered	'000	1981-82	64.2	693.9	9.3
Road traffic accidents — Persons killed	number	1981	238	3,321	7.2
Retail sales (excluding motor vehicles, etc.)	\$m	1981-82	3,374.6	(l) 37,157.7	(m) 9.1
Instalment credit for retail sales — Balances outstanding	\$m	1981-82	384.0	3,705.8	10.4
Savings bank deposits per head	\$	1981-82	1,149.7	1,664.2	..
Household income per head	\$	1980-81	7,192	7,406	..
Age and invalid pensions (including wives pensions)	number	June 1981	124,364	1,655,714	7.5
Disability and service pensions	number	June 1981	58,624	695,412	8.4
Student enrolment —					
Government schools	number	1981	207,126	2,299,403	9.0
Non-government schools	number	1981	48,507	687,996	7.1
Universities	number	30 April 1981	12,620	166,611	7.6
Colleges of Advanced Education	number	30 April 1981	20,237	165,067	12.3

(a) Based on Estimated Resident Population. (b) The estimates relate to all persons aged 15 years and over, except members of the permanent defence forces, certain diplomatic personnel of overseas governments, overseas visitors holidaying in Australia and members of non-Australian defence forces in Australia. (c) Not comparable with 'Average weekly earnings per employed male unit' previously published. (d) In terms of greasy wool. Comprises shorn wool, fellmongered wool and wool exported on skins. (e) Dressed carcass weight. Excludes offal. (f) Source: Department of Agriculture, from October 1978. (g) See definitions at the beginning of Chapter VIII. (h) Excludes establishments predominantly engaged in quarrying sand and gravel. (i) As reported to Department of Mines. (j) See Chapter VIII, Part 3. Excludes electricity and gas establishments. (k) Source: Building Activity Survey. Number of dwellings has been rounded to nearest ten units. (l) Excludes details of Australian Capital Territory and Northern Territory. (m) See footnote (l).

APPENDIX

CHAPTER III — CONSTITUTION AND GOVERNMENT

pages 116, 117, 119, 121-3

The Federal Parliament

A conjoint election for the Senate and the House of Representatives was held on 5 March 1983. The following tables show the Western Australian membership of each House resulting from this election.

WESTERN AUSTRALIAN MEMBERS OF THE SENATE

Due to retire on 30 June 1985		Due to retire on 30 June 1988	
Name	Political party	Name	Political party
Cook, P. F.	A.L.P.	Chaney, Hon. F. M.	Lib.
Crichton-Browne, N. A.	Lib.	Coleman, Ruth N.	A.L.P.
Evans, J. G.	A.D.	Durack, Hon. P. D., Q. C.	Lib.
Giles, Patricia J.	A.L.P.	McIntosh, G. D.	A.L.P.
Withers, Rt Hon. R. G.	Lib.	Walsh, P. A.	A.L.P.

A.L.P. = Australian Labor Party. Lib. = Liberal Party of Australia.
A.D. = Australian Democrats

WESTERN AUSTRALIAN MEMBERS OF THE HOUSE OF REPRESENTATIVES

Electoral division	Name	Political party	Electoral division	Name	Political party
Canning	Fatin, Wendy F.	A.L.P.	O'Connor	Tuckey, C. W.	Lib.
Curtin	Rocher, A. C.	Lib.	Perth	Charlesworth, R. I.	A.L.P.
Forrest	Drummond, P. H.	Lib.	Stirling	Edwards, R. F.	A.L.P.
Fremantle	Dawkins, J. S.	A.L.P.	Swan	Beazley, K. C.	A.L.P.
Kalgoorlie	Campbell, G.	A.L.P.	Tangney	Gear, G.	A.L.P.
Moore	Blanchard, A.	A.L.P.			

A.L.P. = Australian Labor Party. Lib. = Liberal Party of Australia.

The State Parliament

At the conjoint election for the Legislative Council and the Legislative Assembly held on 19 February 1983, the Australian Labor Party led by the Honourable B. T. Burke, was elected to office with a majority in the Legislative Assembly of seven seats.

The Ministry from 25 February 1983, and membership of the Legislative Council and the Legislative Assembly as a result of the elections are given in the following tables.

THE MINISTRY FROM 25 FEBRUARY 1983

Name of Minister	Title of Office
Hon. Brian Thomas Burke, M.L.A.	Premier and Cabinet, Treasurer, Minister Co-ordinating Economic and Social Development, and Minister for Forests, Tourism, and Women's Interests
Hon. Malcolm John Bryce, B.A., M.L.A.	Deputy Premier, and Minister for Economic Development and Technology
Hon. Desmond Keith Dans, M.L.C.	Minister for Industrial Relations, and Leader of the Government in the Legislative Council
Hon. Joseph Max Berinson, LL.B., M.L.C.	Attorney-General, Minister for Inter-Governmental Relations and Defence Liaison, Minister Assisting the Treasurer, and Chief Secretary
Hon. Arthur Raymond Tonkin, B.A., Dip.Ed., M.L.A.	Minister for Water Resources, Consumer Affairs, Parliamentary and Electoral Reform, and Leader of the House
Hon. Jeffrey Phillip Carr, B.A., M.L.A.	Minister for Police and Emergency Services, and Local Government
Hon. Ronald Davies, M.L.A.	Minister for Environment, Multi-cultural and Ethnic Affairs, and the Arts
Hon. Hywel David Evans, B.A., M.L.A.	Minister for Agriculture, and Fisheries and Wildlife
Hon. Robert John Pearce, B.A., Dip.Ed., M.L.A.	Minister for Education
Hon. Barry James Hodge, M.L.A.	Minister for Health
Hon. Kenneth Finlay McIver, M.L.A.	Minister for Works, and Lands and Surveys
Hon. David Charles Parker, B.A., M.L.A.	Minister for Employment, Planning and Administrative Services, and Minister Assisting the Minister Co-ordinating Economic and Social Development
Hon. Julian Fletcher Grill, LL.B., M.L.A.	Minister for Transport, and Regional Development and the North West with special responsibility for 'Bunbury 2000'
Hon. Keith James Wilson, M.L.A.	Minister for Housing, Youth and Community Services with special responsibility for Aboriginal Affairs, and Minister for Sport and Recreation
Hon. Peter McCallum Dowding, LL.B., M.L.C.	Minister for Mines, and Fuel and Energy
Terence Joseph Burke, Esquire, M.L.A.	Parliamentary Secretary of the Cabinet

MEMBERS OF THE LEGISLATIVE COUNCIL FROM 22 MAY 1983

Name	Political party	Electoral province
DUE TO RETIRE IN 1986 (a)		
Berinson, Hon. Joseph Max, LL.B.	A.L.P.	North Central Metropolitan
Brown, Hon. James McMillan	A.L.P.	South-East
Dowding, Hon. Peter McCallum, LL.B.	A.L.P.	North
Elliott, Hon. Lyla Daphne	A.L.P.	North-East Metropolitan
Gayfer, Hon. Harry Walter	N.C.P.	Central
Hetherington, Hon. Robert, B.A.	A.L.P.	South-East Metropolitan
Kelly, Hon. Garry Kenneth, B.App. Sc. (Physics)	A.L.P.	South Metropolitan
Knight, Hon. Thomas, A.F.A.I.M., A.A.I.B.	Lib.	South
Lewis, Hon. Alexander Ashley	Lib.	Lower Central
Lockyer, Hon. Philip Harry	Lib.	Lower North
McAleer, Hon. Margaret	Lib.	Upper West
MacKinnon, Hon. Graham Charles, C.M.G.	Lib.	South West

MEMBERS OF THE LEGISLATIVE COUNCIL FROM 22 MAY 1983 — *continued*

Name	Political party	Electoral province
Masters, Hon. Gordon Edgar	Lib.	West
Medcalf, Hon. Ian George, E.D., Q.C.	Lib.	Metropolitan
Pendal, Hon. Phillip George	Lib.	South Central Metropolitan
Pratt, Hon. Ian George	Lib.	Lower West
Wells, Hon. Peter Henry	Lib.	North Metropolitan
DUE TO RETIRE IN 1989 (a)		
Atkinson, Hon. Gordon William	Lib.	Central
Bell, Hon. Colin John	Lib.	Lower West
Dans, Hon. Desmond Keith	A.L.P.	South Metropolitan
Edwards, Hon. Graham	A.L.P.	North Metropolitan
Ferry, Hon. Victor Jasper, D.F.C.	Lib.	South-West
Griffiths, Hon. Clive Edward	Lib.	South Central Metropolitan
Hallahan, Hon. Kay	A.L.P.	South-East Metropolitan
McKenzie, Hon. Fred Evan	A.L.P.	North-East Metropolitan
McNeil, Hon. Thomas	N.P.	Upper West
Moore, Hon. Norman Frederick, B.A., Dip.Ed.	Lib.	Lower North
Nevill, Hon. Mark Warriedar	A.L.P.	South-East
Oliver, Hon. Oscar Neil	Lib.	West
Piantadosi, Hon. Samuel Mathew	A.L.P.	North Central Metropolitan
Stephens, Hon. Matthew Ernest	A.L.P.	North
Stretch, Hon. William Noel	Lib.	Lower Central
Williams, Hon. Richard John Lloyd, B.A.	Lib.	Metropolitan
Wordsworth, Hon. David John	Lib.	South

A.L.P. = Australian Labor Party. N.C.P. = National Country Party.

Lib. = The Liberal Party of Australia (Western Australian Division) Incorporated.

N.P. = National Party.

(a) Section 8 of the *Constitution Acts Amendment Act 1899-1981* provides that a retiring member shall vacate his seat on 21 May in the year of retirement.

MEMBERS OF THE LEGISLATIVE ASSEMBLY
After General Elections of 19 February 1983

Name	Political party	Electoral district
Barnett, Michael	A.L.P.	Rockingham
Bateman, Thomas Henry	A.L.P.	Canning
Beggs, Pamela Anne	A.L.P.	Whitford
Bertram, Ronald Edward, A.A.S.A.	A.L.P.	Balcatta
Blaikie, Barry Roy	Lib.	Vasse
Bradshaw, John Leslie, M.P.S., J.P.	Lib.	Murray-Wellington
Bridge, Ernest Francis	A.L.P.	Kimberley
Bryce, Hon. Malcolm John, B.A.	A.L.P.	Ascot
Buchanan, Pamela Ann	A.L.P.	Pilbara
Burke, Hon. Brian Thomas	A.L.P.	Balga
Burke, Terence Joseph	A.L.P.	Perth
Burkett, Graham John	A.L.P.	Scarborough
Carr, Hon. Jeffrey Phillip, B.A.	A.L.P.	Geraldton
Clarko, James George, A.E., B.A., Dip.Ed., M.A.C.E., J.P.	Lib.	Karrinyup
Court, Richard Fairfax, B. Com	Lib.	Nedlands
Cowan, Hendy John	N.P.	Merredin
Coyne, Peter Joseph Aloysius	Lib.	Murchison-Eyre
Crane, Albert Victor	N.C.P.	Moore

MEMBERS OF THE LEGISLATIVE ASSEMBLY — *continued*
After General Elections of 19 February 1983

Name	Political party	Electoral district
Dadour, Gabriel Thomas, M.B., B.S.	Lib.	Subiaco
Davies, Hon. Ronald	A.L.P.	Victoria Park
Evans, Hon. Hywel David, B.A.	A.L.P.	Warren
Grayden, Hon. William Leonard	Lib.	South Perth
Grill, Hon. Julian Fletcher, LL.B.	A.L.P.	Esperance-Dundas
Harman, Hon. John Joseph	A.L.P.	Maylands
Hassell, Hon. William Ralph Boucher, LL.B., M.A.	Lib.	Cottesloe
Henderson, Yvonne Daphne, B.A., Dip.Ed.	A.L.P.	Gosnells
Hill, Gordon Leslie	A.L.P.	Helena
Hodge, Hon. Barry James	A.L.P.	Melville
Jamieson, Hon. Colin John	A.L.P.	Welshpool
Jones, Hon. Peter Vernon	N.C.P.	Narrogin
Jones, Thomas Henry	A.L.P.	Collie
Laurance, Hon. Ian James, B.A.	Lib.	Gascoyne
MacKinnon, Hon. Barry John, B. Econ., A.A.S.A.	Lib.	Murdoch
McIver, Hon. Kenneth Finlay	A.L.P.	Avon
McNee, William John	Lib.	Mt Marshall
Mensaros, Hon. Andrew	Lib.	Floreat
O'Connor, Hon. Raymond James	Lib.	Mt Lawley
Old, Hon. Richard Charles	N.C.P.	Katanning-Roe
Parker, Hon. David Charles, B.A.	A.L.P.	Fremantle
Pearce, Hon. Robert John, B.A., Dip.Ed.	A.L.P.	Armadale
Read, John Bell	A.L.P.	Mandurah
Rushton, Hon. Edgar Cyril	Lib.	Dale
Smith, David Lawrence, LL.B.	A.L.P.	Mitchell
Smith, Philip John	A.L.P.	Bunbury
Spriggs, George Clarence Charles	Lib.	Darling Range
Stephens, Matthew Ernest	N.P.	Stirling
Taylor, Hon. Alexander Donald, B.A.	A.L.P.	Cockburn
Taylor, Ian Frederick, B.Econ. (Hons.)	A.L.P.	Kalgoorlie
Thompson, Hon. Ian David	Lib.	Kalamunda
Tonkin, Hon. Arthur Raymond, B.A., Dip.Ed.	A.L.P.	Morley-Swan
Trethowan, Antony Markham, B.A., F.A.I.M., F.Inst.D.	Lib.	East Melville
Troy, Gavan John B.Bus., A.A.I.M.	A.L.P.	Mundaring
Tubby, Reginald John	Lib.	Greenough
Watkins, Jacqueline Patricia	A.L.P.	Joondalup
Watt, Leon Harold	Lib.	Albany
Williams, Rex Geoffrey, A.A.I.M.	Lib.	Clontarf
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STATISTICAL AREAS WESTERN AUSTRALIA

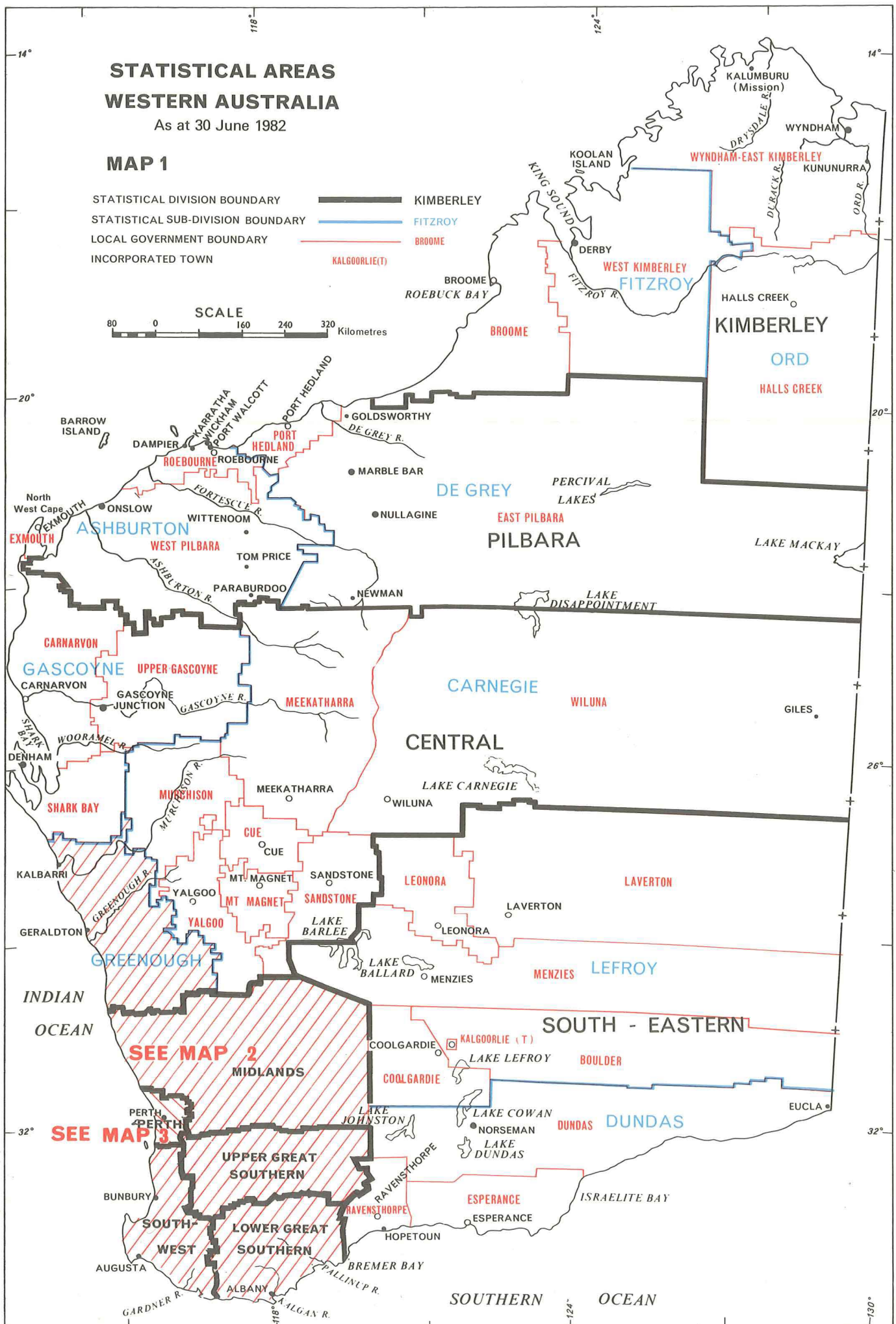
As at 30 June 1982

MAP 1

STATISTICAL DIVISION BOUNDARY
STATISTICAL SUB-DIVISION BOUNDARY
LOCAL GOVERNMENT BOUNDARY
INCORPORATED TOWN

KIMBERLEY
FITZROY
BROOME
KALGOORLIE(T)

SCALE
80 0 160 240 320 Kilometres



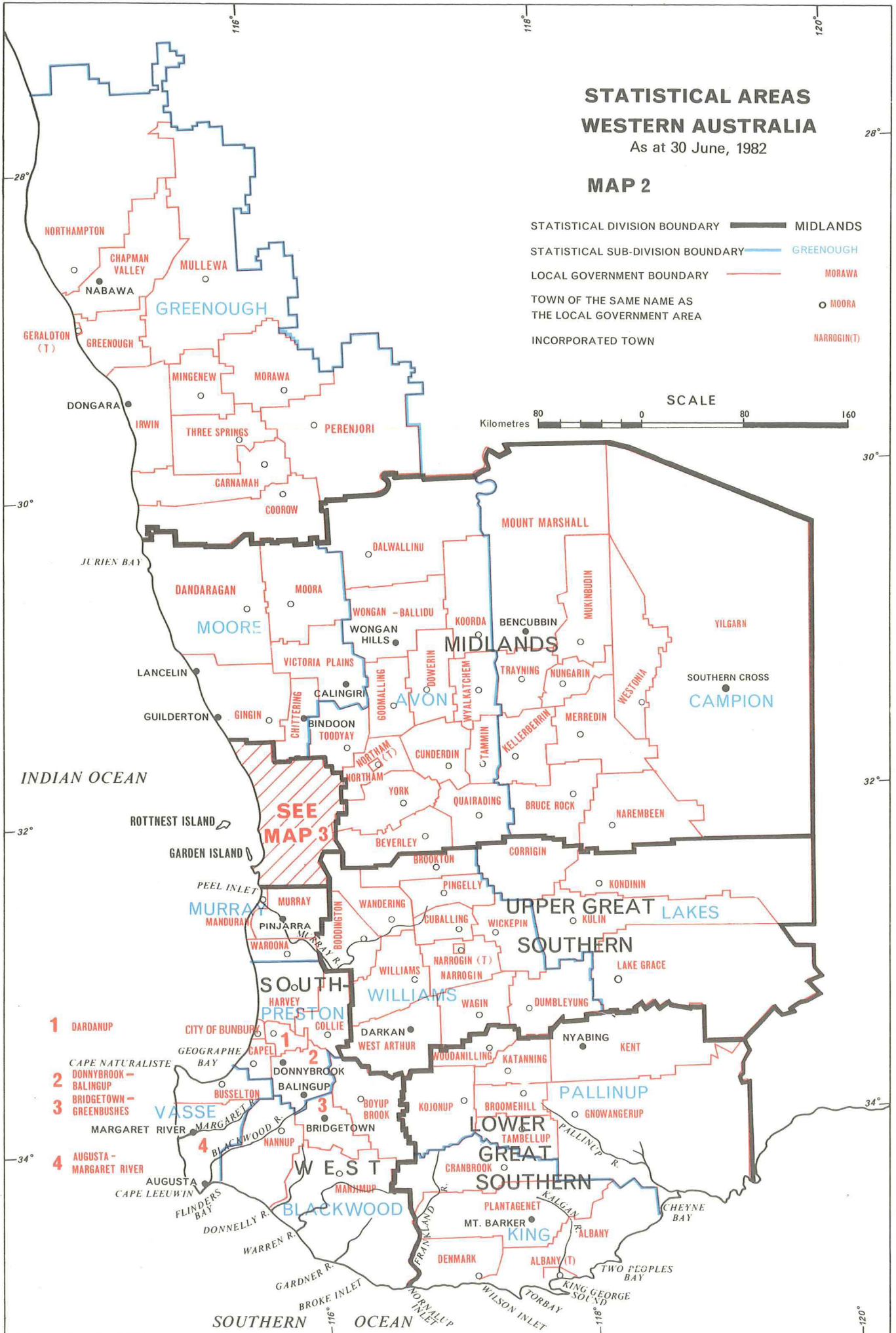
STATISTICAL AREAS WESTERN AUSTRALIA

As at 30 June, 1982

MAP 2

STATISTICAL DIVISION BOUNDARY ——— MIDLANDS
STATISTICAL SUB-DIVISION BOUNDARY ——— GREENOUGH
LOCAL GOVERNMENT BOUNDARY ——— MORAWA
TOWN OF THE SAME NAME AS
THE LOCAL GOVERNMENT AREA ○ MOORA
INCORPORATED TOWN ○ NARROGIN(T)

SCALE
Kilometres 80 0 80 160



As at 30 June, 1982

STATISTICAL DIVISION BOUNDARY ——— PERTH

STATISTICAL SUB-DIVISION BOUNDARY ——— EAST METROPOLITAN

LOCAL GOVERNMENT BOUNDARY ——— SWAN



REF.
319.41
WEST

[Ref. C.]